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# THE CONDOR

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# THE CONDOR

VOLUME 49

JANUARY-FEBRUARY, 1947

NUMBER 1

## ECOLOGICAL NOTES ON THE PREY SELECTED BY A BARN OWL

By FRANCIS C. EVANS and JOHN T. EMLÉN, JR.

A small *Washingtonia* palm (*Washingtonia filifera*) on the University Farm at Davis, California, has served as a daytime roosting site for Barn Owls (*Tyto alba*) for a number of years. Only one owl used the roost from January, 1942, through January, 1943, as indicated by repeated observations and by the accumulation of pellets at the rate of approximately one per day. Pellets collected beneath the tree during this period provided the material for the present paper.

The hunting range of the owl, determined by a number of night observations, seemed to cover an area of about 165 acres, of which 140 were in open fields planted largely to grain and alfalfa and the remaining 25 were in woodland, primarily of cottonwood, valley oak and willow, along the banks of Putah Creek (fig. 1). Shrubby growth was sparse in the wooded areas and absent from the fields. Annual grasses and weeds were luxuriant in winter and spring, sparse in summer and autumn.

Weather conditions for the period of study were characteristic of the locality. Mild winter temperatures prevailed; the mean for December, 1942, the coldest month, was 46.3°F., and the lowest temperature recorded was 27°F. Summer temperatures reached a maximum of 111°F. at noon, but hot days were generally offset by cool nights, and the mean for July, the warmest month, was only 76.4°F. The total precipitation of 18.35 inches recorded for 1942 somewhat exceeded the average 15.88 inches of a 40-year record. The summer months were typically dry; only 0.02 inches of the total precipitation fell between May 26 and October 11. Annual vegetation along the creek banks became dry and brown by June but in the open fields was kept green throughout the summer by surface and overhead irrigation.

**Methods.**—All pellet material was collected under the palm tree roost and taken to the laboratory for detailed analysis. Early in January, 1942, the ground was cleared of all previous material, and fresh pellets were then allowed to accumulate for two months, at the end of which period they were collected *en masse*. This was followed by daily pellet collections for a period of one month. Regular alternation of these two collecting methods provided a daily series and a bulk collection of pellets for each of the four quarters of the year and gave a fairly continuous food record of the owl throughout the year.

The daily collections were analyzed as individual pellets in dry condition, while the mass collections were treated with dilute ammonium hydroxide, washed carefully, and analyzed in bulk. Identification of food items was based upon the bone and chitin content of the pellets and was checked by both of us, first independently, then together.

**Food items.**—Pellets were occasionally broken or poorly formed, making exact enumeration impossible, but a total of approximately 280 pellets was collected from January, 1942, to January 19, 1943 (table 1), 167 in the bulk collections, 113 in the

daily series. These contained 749 separate food items (individual animals) belonging to 15 different species. The number of items per pellet averaged 2.7.

When daily collections were made, a single pellet was taken on 81 occasions, two pellets in 7 cases, three in 6 cases, and no pellets in 24 cases. Single day collections contained from 1 to 8 or an average of 2.4 vertebrate items representing from 1 to 5 species (table 2). Five different species were included in one case, four species were found in 7 cases, three species in 23 cases, two species in 46 cases, and a single species in 18 cases.

Mammals comprised 715 separate food items, or 95.5 per cent of the total food. All of the small terrestrial species of the area were represented, with the exception of the ground squirrel (*Citellus beecheyi*). House mice (*Mus musculus*), pocket gophers



Fig. 1. Map showing approximate boundaries (dashed line) of hunting range of Barn Owl at Davis, California. Roosting site in palm indicated by arrow.

(*Thomomys bottae*), meadow mice (*Microtus californicus*), and deer mice (*Peromyscus maniculatus*), the four most numerous mammals on the area, contributed 94.8 per cent of the mammalian items and 90.6 per cent of the total of all items. The scarcer and more localized harvest mice (*Reithrodontomys megalotis*), roof rats (*Rattus rattus*) and shrews (*Sorex* sp.) were represented by 33 individuals. Four skulls of jack rabbits (*Lepus californicus*) were also found in the pellets, all of them belonging to very small, juvenal animals; adult jacks, numerous in the area, were probably immune to Barn Owl attack because of their size.

Six species of birds contributed 19 items or 2.5 per cent of the total. The Savannah Sparrow (*Passerculus sandwichensis*), a common wintering bird in the Davis area, was the only species represented in appreciable numbers—11 specimens. Crowned sparrows (*Zonotrichia leucophrys* and/or *coronata*) contributed 3 specimens, and the Mockingbird (*Mimus polyglottos*), Pipit (*Anthus spinoletta*), Western Meadowlark (*Sturnella neglecta*), and House Finch (*Carpodacus mexicanus*) were each represented by a single specimen.

The only invertebrate items found in the pellets belonged to a species of Jerusalem or sand cricket (*Stenopelmatus*). Of the 15 individuals represented in the total, 8 were included in a single day's collection.

*Habits and habitat relationships of prey species.*—Of the 749 animals recovered from the pellets, 730 or 97.5 per cent belonged to nocturnally active species. All of the mammals taken were nocturnal; the ground squirrel, the only resident rodent not represented, is almost exclusively diurnal in habit. The 19 specimens of diurnal animals were all birds belonging to species which roosted at night on the owl's feeding range.

All habitat types in the area contributed to the owl's bill of fare. Animals typically associated with wooded or brushy cover comprised 57 per cent of the total food items. These included the shrew, deer mouse, harvest mouse, house mouse, roof rat, and, among the birds, the Mockingbird, House Finch, and crowned sparrows. Open field habitats, more than six times as extensive on the owl's range, contributed the remaining 43 per cent of the items. These included the pocket gopher, meadow mouse, jack rabbit, and the Pipit, Western Meadowlark and Savannah Sparrow which commonly roosted at night in the grassy fields.

In the 94 daily collections, inhabitants of wooded and open habitat types were taken together in 39 instances, 29 collections contained field dwellers only, and 26 had woodland types only. This appeared to be a random distribution, and there was no sequence of occurrence to suggest seasonal or other regulated changes in the choice of hunting grounds.

*Fluctuations in relative abundance of prey species.*—Pronounced changes in the relative abundance of prey species in the pellets occurred during the period of study (table 3, fig. 2). Some of these appeared to be of seasonal origin; others were probably of a longer-term nature. Animals of woodland and woodland border habitats, notably house mice and deer mice, were heavily represented in the first quarter of the study period but were

Table 1  
Food Items in Barn Owl Pellets

|                        | Number of items | Per cent of total |
|------------------------|-----------------|-------------------|
| Mammals                |                 |                   |
| <i>Mus</i>             | 283             | 37.8              |
| <i>Thomomys</i>        | 193             | 25.8              |
| <i>Microtus</i>        | 110             | 14.7              |
| <i>Peromyscus</i>      | 92              | 12.3              |
| <i>Reithrodontomys</i> | 19              | 2.5               |
| <i>Rattus</i>          | 8               | 1.1               |
| <i>Sorex</i>           | 6               | .8                |
| <i>Lepus</i>           | 4               | .5                |
| Total mammals          | (715)           | (95.5)            |
| Birds                  |                 |                   |
| <i>Passerculus</i>     | 11              | 1.5               |
| <i>Zonotrichia</i>     | 3               | .4                |
| <i>Mimus</i>           | 1               | .1                |
| <i>Anthus</i>          | 1               | .1                |
| <i>Sturnella</i>       | 1               | .1                |
| <i>Carpodacus</i>      | 1               | .1                |
| Unidentified           | 1               | .1                |
| Total birds            | (19)            | (2.5)             |
| Insects                |                 |                   |
| <i>Stenopelmatus</i>   | 15              | 2.0               |
| Total insects          | (15)            | (2.0)             |
| Total food             | 749             | 100.0             |

Table 2

Contents of Barn Owl Pellets Collected Daily for Monthly Periods at Different Seasons of the Year

| Beginning of collection period | Days of collection period |    |    |    |    |    |    |    |    |    |    |    |
|--------------------------------|---------------------------|----|----|----|----|----|----|----|----|----|----|----|
|                                | 1                         | 5  | 10 | 15 | 20 | 25 | 30 |    |    |    |    |    |
| March 17, 1942                 |                           |    |    |    |    |    |    |    |    |    |    |    |
| <i>Thomomys</i>                | ..                        | 2  | .. | 1  | 1  | .. | 1  | 1  | .. | 1  | 1  | 1  |
| <i>Microtus</i>                | ..                        | 1  | .. | 1  | .. | 1  | .. | 1  | 2  | .. | 1  | 1  |
| <i>Peromyscus</i>              | ..                        | 5  | 7  | 3  | 1  | .. | 1  | 2  | .. | 1  | .. | .. |
| <i>Mus</i>                     | 5                         | 2  | .. | 1  | 1  | 2  | 3  | .. | 1  | 4  | 1  | 3  |
| <i>Reithrodontomys</i>         | 1                         | .. | .. | 2  | .. | .. | .. | 1  | .. | .. | .. | .. |
| <i>Lepus</i>                   | ..                        | .. | .. | .. | .. | 1  | .. | 1  | .. | .. | .. | .. |
| <i>Passerculus</i>             | ..                        | .. | .. | 1  | 1  | 1  | 1  | .. | 1  | .. | 1  | .. |
| Number pellets                 | 1                         | 0  | 1  | x  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  |
| June 17, 1942                  |                           |    |    |    |    |    |    |    |    |    |    |    |
| <i>Thomomys</i>                | ..                        | 1  | 1  | 2  | .. | 1  | 1  | .. | 1  | .. | 1  | 3  |
| <i>Microtus</i>                | 2                         | 1  | .. | 2  | 4  | 1  | 1  | 3  | 1  | 2  | 3  | 1  |
| <i>Peromyscus</i>              | ..                        | 1  | 1  | 1  | .. | 1  | 3  | .. | 1  | 3  | .. | .. |
| <i>Mus</i>                     | 1                         | 1  | .. | .. | .. | .. | 4  | 3  | 1  | .. | .. | .. |
| <i>Rattus</i>                  | ..                        | .. | .. | .. | .. | .. | .. | 1  | .. | .. | .. | .. |
| <i>Reithrodontomys</i>         | ..                        | .. | .. | .. | .. | .. | .. | 1  | .. | 2  | .. | 1  |
| <i>Stenopelmatus</i>           | ..                        | 1  | .. | .. | 1  | .. | 1  | .. | 1  | .. | 1  | .. |
| Number pellets                 | 1                         | 0  | 3  | 1  | 1  | 2  | 1  | 1  | 1  | 3  | 1  | 1  |
| September 23, 1942             |                           |    |    |    |    |    |    |    |    |    |    |    |
| <i>Thomomys</i>                | ..                        | 2  | .. | 1  | 1  | .. | 1  | .. | 1  | 1  | .. | 2  |
| <i>Microtus</i>                | ..                        | 1  | 1  | .. | 1  | .. | .. | 1  | .. | 1  | .. | 2  |
| <i>Peromyscus</i>              | 1                         | 1  | .. | 1  | .. | 1  | .. | 2  | 1  | 1  | 1  | 1  |
| <i>Mus</i>                     | 3                         | 2  | 4  | .. | 1  | 2  | .. | 3  | 3  | 1  | 1  | 3  |
| <i>Rattus</i>                  | ..                        | .. | .. | .. | 1  | .. | 1  | .. | .. | .. | .. | .. |
| <i>Reithrodontomys</i>         | ..                        | .. | 1  | 2  | .. | .. | 1  | .. | 1  | .. | .. | .. |
| <i>Sorex</i>                   | ..                        | .. | .. | .. | .. | .. | .. | .. | 2  | .. | .. | .. |
| <i>Mimus</i>                   | ..                        | .. | .. | .. | .. | .. | .. | .. | .. | 1  | .. | .. |
| Unidentified                   | ..                        | 1  | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| <i>Stenopelmatus</i>           | ..                        | .. | .. | .. | .. | .. | .. | .. | 1  | .. | .. | .. |
| Number pellets                 | 1                         | 2  | 2  | 0  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  |
| December 19, 1942              |                           |    |    |    |    |    |    |    |    |    |    |    |
| <i>Thomomys</i>                | ..                        | .. | 1  | 1  | .. | 1  | 2  | .. | 1  | .. | 2  | 3  |
| <i>Microtus</i>                | ..                        | .. | 1  | 1  | .. | .. | .. | 1  | 3  | 2  | .. | 1  |
| <i>Peromyscus</i>              | ..                        | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3  | .. |
| <i>Mus</i>                     | ..                        | 3  | .. | 1  | .. | 1  | 2  | .. | 1  | .. | 1  | 1  |
| <i>Reithrodontomys</i>         | ..                        | .. | .. | .. | .. | .. | 1  | .. | .. | .. | .. | .. |
| <i>Lepus</i>                   | ..                        | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1  | .. |
| <i>Anthus</i>                  | ..                        | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1  | .. |
| <i>Passerculus</i>             | ..                        | .. | .. | .. | .. | .. | 1  | .. | .. | .. | 1  | .. |
| <i>Stenopelmatus</i>           | ..                        | .. | .. | .. | .. | .. | 8  | .. | .. | .. | .. | .. |
| Number pellets                 | 0                         | x  | 1  | 0  | 0  | 1  | x  | 1  | 1  | 0  | 1  | 1  |

x = No collection made.

much reduced in the last. The decline in house mice corresponded roughly with a marked reduction of this species in the area as indicated by live-trapping studies (Evans and Storer, 1944). On the other hand, pocket gophers, living in the open fields, rose steadily from less than 10 per cent of the food items in the first quarter to nearly 50 per cent in the last. Increased surface activity of gophers was observed in the late autumn. Meadow mice, also field dwellers, likewise reached their maximum representation in the late autumn and early winter.

Larger mammal species occurred infrequently in the pellets. Of the 8 roof rats taken, 7 were young individuals and were caught between July and September when young rats were most frequently captured in live-traps. Young jack rabbits were found in the

pellets principally in April and May when they were most in evidence in the fields; a single specimen was taken in a January pellet.

Birds occurred most frequently in the pellets in winter and early spring when field-roosting species, notably the Savannah Sparrow, were numerous in the area.

Table 3  
Food Items Taken by a Barn Owl

|                        | Jan. to<br>April 17 | April 18-<br>July 17 | July 18-<br>Oct. 23 | Oct. 24-<br>Jan. 19 | Total |
|------------------------|---------------------|----------------------|---------------------|---------------------|-------|
| Mammals                |                     |                      |                     |                     |       |
| <i>Thomomys</i>        | 18                  | 41                   | 59                  | 75                  | 193   |
| <i>Microtus</i>        | 17                  | 41                   | 11                  | 41                  | 110   |
| <i>Peromyscus</i>      | 36                  | 22                   | 27                  | 7                   | 92    |
| <i>Mus</i>             | 102                 | 75                   | 78                  | 28                  | 283   |
| <i>Rattus</i>          | 0                   | 1                    | 7                   | 0                   | 8     |
| <i>Reithrodontomys</i> | 6                   | 6                    | 6                   | 1                   | 19    |
| <i>Lepus</i>           | 2                   | 1                    | 0                   | 1                   | 4     |
| <i>Sorex</i>           | 0                   | 1                    | 3                   | 2                   | 6     |
| Birds                  |                     |                      |                     |                     |       |
| <i>Mimus</i>           | 0                   | 0                    | 1                   | 0                   | 1     |
| <i>Anthus</i>          | 0                   | 0                    | 0                   | 1                   | 1     |
| <i>Sturnella</i>       | 1                   | 0                    | 0                   | 0                   | 1     |
| <i>Carpodacus</i>      | 0                   | 0                    | 1                   | 0                   | 1     |
| <i>Passerculus</i>     | 7                   | 2                    | 0                   | 2                   | 11    |
| <i>Zonotrichia</i>     | 0                   | 1                    | 0                   | 2                   | 3     |
| Unidentified           | 0                   | 0                    | 1                   | 0                   | 1     |
| Insects                |                     |                      |                     |                     |       |
| <i>Stenopelmatus</i>   | 2                   | 3                    | 2                   | 8                   | 15    |
| Number food items      | 191                 | 194                  | 196                 | 168                 | 749   |
| Number pellets         | 60                  | 64                   | 85                  | 71                  | 280   |

Day-to-day fluctuations in occurrence of the various food items (table 2) were compared with weather data for the corresponding periods, but no correlation was obtained.

*Total food consumption.*—That bones of small birds and mammals are well preserved in the process of owl pellet formation has been shown by various authors (Errington, 1930; Chitty, 1938; Glading, Tillotson and Selleck, 1943). Hence pellet analysis provides a fairly satisfactory clue to the number of these food items taken.

Table 4  
Bulk Contribution of Prey Species to Pellets

| Species       | Total items<br>in pellets | Estimated average<br>weights of animals<br>eaten | Bulk<br>contribution |
|---------------|---------------------------|--|----------------------|
| House mouse   | 283                       | 15 grams   | 4,245 grams          |
| Pocket gopher | 193                       | 85   | 16,405               |
| Meadow mouse  | 110                       | 40   | 4,400                |
| Deer mouse    | 92                        | 20   | 1,840                |
| Harvest mouse | 19                        | 15   | 285                  |
| Roof rat      | 8                         | 65   | 520                  |
| Shrew         | 6                         | 5  | 30                   |
| Jack rabbit   | 4                         | 75   | 300                  |
| Birds         | 19                        | 30   | 570                  |
| Insects       | 15                        | 2  | 30                   |
| Total         | 749                       |  | 28,625               |

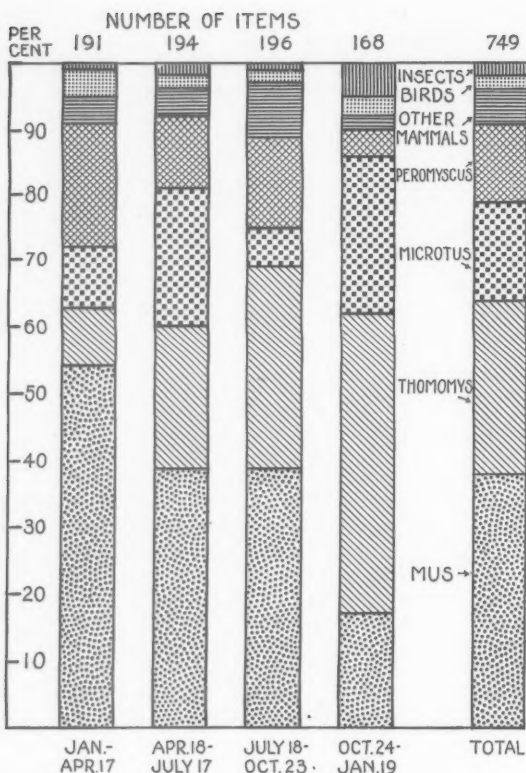


Fig. 2. Percentage representation of food taken by Barn Owl from January, 1942, to January, 1943.

Cowan (1942) and others have stressed the importance of the bulk contribution of the various prey species in predator food habit studies. Small species that are numerically abundant may provide relatively little bulk; larger species are not always completely devoured and may therefore be inaccurately represented in the pellets. Using measurements of the pellet material collected during the period of study as a basis, we have attempted to calculate the bulk contribution of each species to the food consumed by our owl (table 4).

Observations by Guerin (1928) of Barn Owls in France indicated that at least two pellets are produced in a 24-hour period; one, containing the remains of food taken during the previous evening and night, is dropped about dawn at some undetermined site in the hunting territory, while the second, comprising food taken after regurgitation of the first pellet, is dropped at the diurnal roosting site during the course of the day. Moon (1940) found evidence of both day and night pellets dropped by Barn Owls in Kansas. Our data probably represent the food intake of the morning feeding period only, and it is likely that the total food intake during the period of study is roughly twice that



indicated above. This would mean that our owl ate approximately 57 kilograms or 126 pounds of food in the 384 days of the study. The average amount of food consumed daily was thus about 150 grams, roughly one-quarter of the weight of an average adult Barn Owl.

*Summary.*—Pellets of a Barn Owl at Davis, California, were collected from January, 1942, through January, 1943. The hunting range of the owl included 140 acres of open fields and 25 acres of wooded creek bank. A total of approximately 280 pellets was collected: these contained 749 separate food items, of which mammals comprised 95.5 per cent, birds 2.5 per cent, and insects 2 per cent. All the species represented were nocturnal except for the birds; these latter may well have been caught on or near their night roosts. Animals typically associated with wooded or brushy cover comprised 57 per cent of the total food items, while open field habitats contributed 43 per cent. Woodland inhabitants, notably house mice and deer mice, were heavily represented at first but were much reduced at the end of the study period; the house mouse decrease corresponded roughly with an observed population reduction in the area. Pocket gophers and meadow mice, field-dwelling species, reached their maximum representation in the late autumn and early winter. An estimate of the bulk contribution of each prey species indicated a total consumption by the owl of approximately 126 pounds of food during the period of study, or roughly one-fourth of its body weight per day.

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*Division of Zoology, University of California, Davis, California, July 10, 1946.*

## A PRELIMINARY SURVEY OF TRENDS IN AVIAN EVOLUTION FROM PLEISTOCENE TO RECENT TIME

By HILDEGARDE HOWARD

In birds there has been little opportunity to observe evolution within individual groups. It is true that by means of the Jurassic archaeopterids the reptilian ancestry of the class as a whole has been made remarkably clear. And the toothed forms of the Cretaceous have brought to light the very early beginnings of adaptive modifications. Of the evolutionary lines of various avian orders or families, however, little can be said.

A few Eocene forms point to the common ancestry of certain closely related present-day families or subfamilies. The Hungarian *Eostega*, for example, apparently links the boobies and cormorants, and *Romainvillia* of France may have represented a group from which both ducks and geese were derived. But there are no avian fossils which provide a good consecutive series of evolutionary stages, such as have been found among the mammals in the horses, camels, and dogs.

Bird bones are extremely fragile, and as a consequence frequently have not survived the upheavals and metamorphic disturbances to which the older strata have been subjected. Rarely are the elements of a bird skeleton found associated. Dissociated elements are not a very satisfactory substitute, especially since, in the birds, there is nothing comparable to the dental battery of mammals which holds up well under fossilization and contributes the most valuable type of information on evolutionary progress.

Another difficulty encountered in attempting to study avian evolution is the apparent slowness with which changes have been effected in this group. Miocene birds, for example, can be assigned in many instances to modern genera, and the similarities of skeletal structure between Miocene and Recent birds are remarkable. This is a very different situation from that which obtains among the mammals, where each geologic epoch of the Tertiary brought its marked changes in structure. Among the birds, therefore, we are grateful for the slightest knowledge pertaining to evolutionary trends.

Approaching the Recent epoch, avian fossils become more abundant and in some of the Pleistocene deposits of the west coast, we have an opportunity to examine thousands of specimens. In spite of the dissociation of skeletal elements in these deposits, the great numbers of bones make possible secondary association which presents, with a fair degree of accuracy, an idea of the skeleton as a whole. Although in many instances the species which occur represent almost the end result in a long line of evolution which is obscured, it is now becoming evident that something of the evolutionary trend may be revealed by careful analyses of the large series available in contrast with series of skeletons of modern birds.

Examining the contents of these Pleistocene deposits, it is, of course, the extinct species (the forms which are obviously different from those of today) which first draw attention. Each record of a fossil locality centers around descriptions of new forms, with a few appended remarks on other species found. The great Pleistocene asphalt deposits of Rancho La Brea, for example, are noted for the occurrence of the huge vulture, *Teratornis*, the several species of strange eagles, the large stork, and others. These are naturally of interest and of importance in obtaining a knowledge of prehistoric bird life. But even more significant are the much less glamorous, although very much more abundant species which tie into our modern picture. At Rancho La Brea there are over 90 species which are almost or entirely indistinguishable from living birds, and only 15

which have left no modern descendants. Nearly 90 per cent, then, of the avian species in this typical Pleistocene deposit are a significant source of our present avifauna. This is in marked contrast with the mammalian assemblage from the same locality; over 40 per cent of the mammalian species recorded there are now completely extinct.

Surveying the Pleistocene avian picture of the entire west coast, the situation is very much the same. We find 36 species of birds which are so distinctive that they cannot possibly be considered ancestral to any living form. These include several water birds, a large number of raptors (mostly of large size), and a few other land birds. Some of the extinct forms represent groups which may have had a long history in our area, but are today found elsewhere. Such examples are: the Del Rey Gannet, *Moris reykana*, which was apparently one of the last of the sulids in California, where, since at least Miocene time, the Sulidae had been well represented; the "Pigmy Goose," *Ana-bernacula*, possibly of shelldrake affinity, which appears in the Pliocene of Arizona and in both California and Oregon in the Pleistocene; and the two aegyptiine representatives, *Neophrontops americanus* and *Neogyps errans*, whose ancestors were known in America well back into the Miocene. Others appear and disappear with the Pleistocene, having left no clue, as yet discovered, as to their past.

The remainder of the fossil avifauna of the Pacific coast, some 150 species, is probably directly related to the avifauna of today. Among the members of this group there has been some shifting in local distribution in keeping with changing ecologic conditions, and, in certain instances, there has been slight structural change within individual species (or, perhaps we should say within the ancestral line of a species), but in general the Pleistocene picture, once the obviously extinct species are eliminated, is remarkably similar to that of today.

It is the occurrence of the slight structural changes which merits particular consideration. In a few instances it has recently been discovered that series of Pleistocene bones are not identical with comparable modern series and yet are so similar as strongly to suggest direct ancestral relationship. Some such instances have been discovered within groups thought at first to be identical with modern forms, and others have resulted in the combining of two species, one of which had been previously recorded as extinct, the other as modern. The present status of these "ancestral" Pleistocene forms is varied, about half bearing distinct names, the others classified under the name of the related living species. Their proper taxonomic treatment presents a problem which has been made the subject of a separate discussion by the present author (Auk, in press).

Turning now to a discussion of these occurrences which have recently been given attention, it is appropriate to consider first the raptorial birds. These, by reason of the character of the California asphalt deposits, are particularly well represented in the west coast Pleistocene record. There are, in addition to the extinct species, about 30 forms which are similar to birds of the Recent epoch. Some of these appear to be identical with the living representatives. Others, however, reveal small differences.

Outstanding among the raptors which have been found to differ slightly in their Pleistocene form are the California Condor and the Golden Eagle, both of which have been previously recorded from the Pleistocene by the scientific names today applied to the living birds. The condor now has been combined with a Pleistocene species described earlier from northern California, *Gymnogyps amplus* (Fisher, Condor, 46, 1944:289-290); the status of the eagle has not yet been decided. Careful studies were made of large series of skulls of each of these raptors from the Rancho La Brea asphalt deposits (Fisher, *loc. cit.*; and Howard, Auk, in press). These studies revealed structural differences from the modern birds, so slight as to have been unnoticed, or considered merely

variants from the norm, had there not been so large a number of specimens for examination. Although in only one or two instances actual measurements of the fossils fail to overlap similar measurements on the modern related species, ratios of one part of the skull to another widen the gap sufficiently to distinguish the two populations in each case. Only in the skull, however, are these distinguishing features marked. The rest of the fossil skeletons, except for slightly different size range and possible differences in proportions of leg to wing, appears to be structurally identical with the modern.

It seems logical to conclude that in this fossil representation we have the direct ancestors of the modern Golden Eagle and California Condor. A comparison of fossil with Recent specimens, therefore, reveals the minuteness of change which has taken place over a period of some 50,000 years or more. In the case of the eagle, we may postulate that the changes were adaptive. The strong jaws, and the musculature to operate them, which characterized the Pleistocene form, were appropriate for the day in which it lived—the day of larger mammals. As smaller forms began to dominate the scene, the need for heavy equipment to cope with larger prey would, presumably, have diminished. Possibly some similar explanation may account for the changes within the condor. In both of these birds we see reflected the trend toward smaller size (from Pleistocene to Recent time) which, in the over-all picture of the raptor group, is observable in the extinction of the larger eagles and vultures, and the increased abundance of the smaller hawks and owls.

In the Rancho La Brea Caracara (*Polyborus prelustos*) the situation is slightly different. The characteristics of the bones of this bird tend to blend together those of both living species of *Polyborus* and also to resemble the Guadalupe Island species, extinct within historic time (Howard, Carnegie Inst. Wash., publ. no. 487, 1938:217-240). For this reason the earlier records of the bird referred it first to *Polyborus tharus*, and later to *P. cheriway*, with the suggestion, also, that possibly both species were represented.

Distinguishing characteristics are discernible in several skeletal elements in the Rancho La Brea Caracara, with, however, an overlap of the fossil form with all three Recent species. Whether or not the Pleistocene bird was actually ancestral to all of the Recent species is problematical. In view of the very slight changes observed in other groups, this is doubtful. There seems little question, however, that the Guadalupe Island bird was descended from Pleistocene stock very similar to the La Brea bird. The differences noted between the island species and the fossil bird are of about the same degree as those noted for the two populations of the Golden Eagle, or of the California Condor.

Among the nocturnal predators, it is likely that the Horned Owl may be included among the forms which have undergone some structural change since Pleistocene time. Measurements made some years ago on series of specimens from Rancho La Brea indicated that the fossil bird averaged larger than its modern representative, although, at the time, the great variability in size was stressed more than the larger average (Husband, Condor, 26, 1924:220-225). It has since been discovered that some of the specimens included in the measurements belong to another, somewhat smaller and more slender species, now described as distinct (*Strix brea* Howard, Condor, 35, 1933:66-69). Removal of these specimens from the series raises the average size of the Rancho La Brea Horned Owl, and, at least in the humerus, eliminates the smaller bones which had been previously compared with the minimum measurements of the modern owl. It is possible, also, that the large *Bubo sinclairi*, from the Pleistocene cave deposits of northern California, is only racially distinct from the Horned Owl of Rancho La Brea. Actually it exceeds only very slightly, if at all, the maximum size for the latter form. Both

the Rancho La Brea series and the specimens from northern California merit careful review.

Among aquatic birds there are two instances in which related modern and extinct forms were reported from the same Pleistocene deposit, namely, the lacustrine beds of Fossil Lake, Oregon. In each case the specimens, when assembled and examined as a whole, indicated the presence of a single species, varying from the related modern bird, but overlapping it as well (Howard, Carnegie Inst. Wash., publ. no. 551, 1946: 148-151, 182-183). The most outstanding of these instances is that of the Western Grebe (*Aechmophorus occidentalis*), of which excellent series of from 30 to 60 specimens for each element are available. The greatest difference between the Pleistocene and Recent grebe populations was found in the tarsometatarsus, the earlier form tending to have a longer, heavier-shafted bone, with, however, a narrower proximal end. Most other skeletal elements, too, showed an average greater length, although this was most marked in the leg elements.

The other species is the Coot (*Fulica americana*), the Pleistocene form of which averaged longer in the leg elements and shorter in the wing bones. It was upon the smallest of the wing bones that the separate species *Fulica minor* was erected. The proportions of leg to wing, however, were well within the variational limits of coots rather than of gallinules. Studying the series of bones of the grebe and of the coot left no doubt in my mind that the Pleistocene populations were ancestral to the living forms.

The foregoing survey, concerned with six examples of change within different avian forms from Pleistocene to Recent time, constitutes a preliminary step in the investigation of evolutionary trends by comparison of large series of specimens from contiguous geologic epochs. The occurrences cited are important to the student of evolution. The spottiness of the fossil record of life as a whole has tended to present a picture of evolution as a series of steps. These studies, which span but a single geologic epoch and which provide an opportunity for examination of large groups of individuals, give evidence of what goes on *between* steps.

The few examples already noted indicate that our modern avian forms did not spring abruptly from some unknown Tertiary ancestors, but that they have gradually assumed their present form through minute changes taking place over thousands of years. The examples cited here appear to demonstrate these changes, and in some instances, even to demonstrate trends of development within individual species. At the same time, however, they emphasize the minuteness of the change which can be expected over a period of 50,000 to 100,000 years. It is no wonder that we must go back several million years to observe any marked difference in avian forms—120 million years to the toothed birds of the Cretaceous, 150 million to *Archaeopteryx*.

It is regrettable that materials are not available to make possible comparisons of the kind discussed above between birds from some of the earlier geologic epochs. Possibly later discoveries may increase our collections from the Tertiary. The survey of the Pleistocene birds, however, will continue, and it is anticipated that many more instances of slight differences between Pleistocene and Recent forms will come to light. When all such occurrences can be examined together, they should, without doubt, add significantly to our understanding of the nature of evolutionary trends among birds.

*Los Angeles Museum, Los Angeles, California, August 12, 1946.*

## THE LIFE HISTORY OF THE LAYSAN RAIL

By PAUL H. BALDWIN

The Laysan Rail (*Porzana palmeri*) was never made the subject of an extended study and hence information on this apparently extinct species is fragmentary and scattered. Since further observation of the living bird is probably not possible, the time is appropriate for the compilation of information from all sources in a species biography, however lacking in completeness it may be. The bird is of biological interest as an example of a species isolated on an oceanic island, where it lost the ability to fly and in other ways displayed the effects of its removal from a complex to a simplified environment. The biology of the Laysan Rail is probably similar to that of other island-dwelling rails such as *Porzana tabuensis* and to such continental forms as the black rails (*Laterallus*) and the yellow rails (*Coturniculus*). Published sources of information cover the span of years between 1843 and 1945. Unpublished records were sought, and a number are made available here for the first time. Informative conversations were had with G. C. Munro, E. L. Caum, T. M. Blackman, and others who had seen the living rail.

The principal observers of the Laysan Rail and the dates of their observations in the field on Laysan Island are: Palmer and Munro, June 16-28, 1891; Schauinsland, June 24 and throughout the summer of 1896; Fisher, May 16-23, 1902; and Dill, April 25-June 5, 1911. Blackman observed from December 6, 1939, through May, 1940, on the Midway Islands. All months except October and November are represented by field observations, and the records provide a fairly good basis for dating seasonal events in the life of the rail.

The rail was seen by sailors of the *Moller* in 1828, on Laysan Island, according to Kittlitz (Rothschild, 1900:v). A presumably identical or similar bird, not subsequently known, was also recorded by Kittlitz as seen on nearby Lisianski Island. The Laysan bird was first collected when the Rothschild expedition visited Laysan in 1891; it was named by Frohawk in 1892.

During the next 30 years the rail managed to survive on Laysan in spite of guano digging operations that lasted about 15 years, but it ultimately died out as a result of the destruction of vegetation by rabbits liberated by the guano diggers. A colony of rails had been started on Midway by importation in 1891, and this continued in existence for about 43 years, apparently suffering extinction from rats and human disturbance in 1944. In 1929 a third colony was started on Pearl and Hermes Reef, but this apparently was destroyed by storms in 1930. Further details of these happenings are given by Baldwin (1945) and Fisher and Baldwin (1946). In spite of these circumstances Munro (1945:26) continues to hope that the rail may be found on Midway or some other island of the leeward Hawaiian chain. Since no complete bird survey of the leeward Hawaiian chain has been made in the past few years, it is impossible to say that this is a vain hope. With 1828 the year of its discovery and 1944 the year of its apparent extinction, the species had a historical life of 116 years.

The Laysan Rail was one of the smaller species of the family Rallidae, the total length being about 150 mm. The short tail, only 25.4 mm. long, had probably degenerated simultaneously with the flightless wings. The wings were small and rounded, 54 mm. long. The primaries were reduced in number to 8 with the loss or extreme reduction of the 9th and 10th primaries normally found in rails. As in other rails, the legs and feet



were large in proportion to general body size. The bill was stout, straight, and 18 mm. in length. The feet and bill were green, the iris ruby red and the breast mouse gray. The back was pale brown with strongly contrasting chocolate or russet brown shaft streaks. The scapulars, flanks, and sides were sandy brown, while the top of the head was pale brown with dark streaks. The sides of the head, a line over each eye, and the throat were slate gray. None of the colors was brilliant. In size of body and limbs and in shape of bill the Laysan Rail resembled the black rails of the genus *Laterallus*. In plumage pattern it is strikingly similar, the principal difference being a somewhat variable tendency toward an absence of dark pigments in the feathers of the back. This may be of protective significance in view of the whiteness of the coral sand and soil of Laysan.



Fig. 3. Laysan Rail captured in 1923 on Laysan Island.  
Photograph by Donald R. Dickey.

*The environment.*—Laysan Island is a member of the Hawaiian archipelago situated 790 sea miles to the northwest of Honolulu, latitude  $25^{\circ} 2' 14''$  N, longitude  $170^{\circ} 44' 06''$  W. It is oval in shape, approximately two miles long by one mile wide, and has a maximum elevation of about 30 feet. A fringing reef surrounds the island protecting its shores from violent wave action. The central part of the island holds a salty lake, or lagoon, about one mile long by one-third mile wide. The ground surface of Laysan is loosely packed coral sand with flat surfaces of exposed coral reef and phosphate rock on the south and west sides (Bryan, 1942:83). South of the lake, a pool and spring existed at one time.

The climate is sufficiently subtropical to allow such birds as Fairy Terns, Red-tailed Tropic Birds, and Frigate Birds to breed there. At the Midway Islands, about 400 miles to the northwest of Laysan, the temperature ranges from  $50^{\circ}$  to  $85^{\circ}$  F., winds blow occasionally up to 80 miles per hour, and the rainfall is 50 to 60 inches per year, with the months from May to December relatively dry (Hadden, 1941:11-12). Laysan prob-

ably has a similar but somewhat milder climate because of its more southern location.

For a description of the vegetation, the reader is referred to Christopher and Caum (1931) and for a general account of the complex bird life to Fisher (1906).

The rail had no important enemies on Laysan. Fisher thought the habit of slinking about in the shade of grass tussocks or bushes suggested they might have winged enemies, possibly the Frigate Birds. However, he noted that the rails did not hesitate to come out into the sunlight after food and reasoned that perhaps it was the hot sun that caused them to retire to cooler byways. Dill states that Frigate Birds captured rabbits on Laysan, as several times he saw them pick up full grown individuals. The albatrosses, shearwaters, and petrels did not molest the rails. No observations indicate that the egg-breaking Laysan Finch entered rail nests in search of eggs.

*Adult activity.*—Rails as a group are characterized by weak flight and there is complete loss of the ability to fly in many rails that inhabit islands. Examples of flightless rails other than the Laysan rail are the Hawaiian Rail (*Pennula millsi*) and the Wake Island Rail (*Rallus wakensis*). In spite of weak flight many rails are able to make extended migrations or to disperse widely by flight. Probably the ancestral Laysan Rail reached Laysan Island on wing. Once established there, its powers of flight degenerated in correlation with the lack of terrestrial enemies. Individuals making long flights from Laysan, moreover, might have stayed at other places or have become lost at sea. The existence of flightless rails at Lisianski Island, if it actually occurred, may have resulted from this type of dispersal.

Fisher (1906:807) says of the Laysan Rail that it does not seem to exhibit any predisposition to fly. He only saw them spread their wings when hopping up to a perch or when running fast, and then they made no attempt to rise off the ground. In photographs of Laysan Rails taken by Blackman at Midway in 1940, several views of the birds showed blurred wings. This indicates that they probably used their wings for balancing and in bathing and other activities more frequently than was recorded. The motions no doubt were so rapid that they frequently escaped notice.

In its habits the rail was active, swift, and restless. It sped lightly over the sand running from one grass tussock to another, or it crept mouse-like in and out of burrows and through the grass, thrusting its head forward and from side to side inquisitively. It would stop in the shade of plants to peer at an object with one foot poised in air and tail drooped, then progress again with many stops and starts. When pursued, it would dodge in and out of petrel burrows.

It was able to leap and was observed to spring up to a perch or often on to a table where it would search for scraps of meat. It probably could jump in evasive running, and it used its wings freely in such activity. On Midway it was found incapable of jumping out of pits four or five feet deep, and it remained trapped in excavations of this character (Caum, personal communication).

The rails came to buildings in the presence of human beings with far less fear than did chickens. Hadden and Blackman found that they showed little fear if a person remained motionless. In fact, the birds would bathe when Blackman sat three feet from a water pan he set out. During the life of the Midway colony the rails developed no marked fear of man.

A significant contrast in fear reactions in comparable situations is evident in the manner in which incubating adults of the insular Laysan Rail and the continental Black Rail (*Laterallus jamaicensis*) behave in the presence of human beings and their photographic gear. Fisher (1906:802) states that while photographing a nest of a Laysan Rail, he propped back the mass of juncus stems which obscured it. During the adjusting of



apparatus the rail crept on to the nest and began to cover herself with the soft lining, although the camera was only two feet away. He lifted her off, but almost at once she slipped back again and settled down. Then with the dark-cloth he persuaded her to retire to the tall grass, and again she returned immediately.

Walker (1941:246) had a different experience when he tried to photograph a Black Rail at a nest with five eggs. While the camera was being set up, the rail made a short flight from one clump of salicornia to another. During the following five hours while Walker was there, the rail did not go to the nest. A twig laid across the nest when he left at dusk was undisturbed the following morning at daylight. Two of the eggs were now pipped, and from the salicornia nearby the rasping call of one of the watchfully waiting adults could occasionally be heard. In the course of the day the pipped eggs hatched without parental aid. Walker concluded that this event "supported published accounts of the sensitiveness of this rail to intrusions upon its nest."

Types of behavior that have impressed the various observers were: restless activity, inquisitiveness, fearlessness, rapid alarm reaction, persistence. Changes in responses which seem likely to have occurred owing to isolation at Laysan were associated with fearlessness. Inquisitiveness probably was given greater play when fear inhibitions were removed, and the ability to recognize terrestrial enemies may have become somewhat dulled. The general alertness of the rail was not lost, as shown by its inquisitive and industrious behavior.

In the morning the bird was extremely active and on occasion kept up the activity throughout the day. In the middle of the day it was reported less active by Fisher, who made summer observations at Laysan. Blackman's observations at Midway were contrary to this, for he found little difference in activity in the course of the day. It is possible that in the summer heat of the more southern island the birds became inactive and sought shade to a greater extent than they did in the milder winter climate of the more northern island. All observers report that the activity was again great in the late afternoon and continued until dark. The rail was not seen abroad at night, although Blackman (1945:298) heard its cry at all hours of the night and supposed it was active in the darkness.

During foraging, notes were uttered intermittently; Schauinsland (1899:45) saw them stop their hunt from time to time to warble a "song." Frohawk's captive rails chirped incessantly during the day, uttering from one to three short, soft notes. Wild rails "rattled" with swollen throats and bills slightly opened while standing in the shade. The calls may have been louder and more frequent during the breeding season and were perhaps associated with individual territories, as Blackman recorded that an adult male gave the loud rattling call at a spot most frequented by this bird and its mate. Perhaps an incident described by Fisher (1906:801) had similar significance. He "saw two approach each other with feathers erect and when close together begin rattling in each other's face. Then they suddenly ceased and slunk away in opposite directions." An evening manifestation of communal song terminating the daytime voicings was noted by Frohawk (1899:248), who wrote: "Soon after dusk they all, as if by one given signal, strike up a most peculiar chorus, which lasts but a few seconds, and then all remain silent. I can only compare the sound to a handful or two of marbles being thrown on a glass roof and then descending in a succession of bounds."

Blackman (1940:27) saw a male and female, apparently mates, perform as follows: "They sat several minutes close together close to main stem of a bush on the shady side and in turn held their heads down close to the ground while the other picked among the feathers at the top of head and back of neck." This seems to be mutual preening.

*Food and feeding.*—Schauinsland was impressed with the fact that this rail had become virtually an omnivore, whereas originally, he thought, it must have fed largely on worms and other aquatic invertebrates. Many statements in the accounts consulted show that the Laysan Rails ate mainly insects, secondarily, the contents of sea birds' eggs and, additionally, flesh from corpses of birds, green vegetable material (Fisher, 1906:801) and seeds (Fisher, *loc. cit.*; Caum, personal communication referring to captive birds). All these foods were abundant on Laysan and most were available at all seasons of the year. Some foods were subject to seasonal fluctuations in availability, such as eggs and carrion.

Among the arthropods consumed, flies, maggots, moths, caterpillars, beetles, earwigs and spiders are mentioned. The flies were principally "blow flies" of the family Sarcophagidae and the beetles were of the Dermestidae. Both bred on the bird corpses. The maggots of the flies were eagerly consumed when emerging and going into the ground to pupate. The rails dug them up by flipping the sand sidewise with the beak. The bird was sufficiently swift in its movements to catch flies out of the air and while they were at rest on the corpses and broken eggs. Blackman (1940:3) noted that when they caught a fly at a corpse, "they usually made a sudden run away from the dead bird, devouring the fly a few feet away before returning." Moths and caterpillars were sought on vegetation, and moths were chased in the evening when the insects were in flight.

The eggs of terns and petrels were eaten at every opportunity. As related by Fisher (1906:801), "Mr. Snyder soon found that he had only to break a tern's egg and place it in the open, when a rail would appear and begin to eat it. In this way it was not difficult to secure good photographs. Porzanulas lurk about the outskirts of tern settlements all the time, and I once had to frighten one from a tropic bird's nest while attempting to photograph the egg. I also saw a rail ruffle its feathers and rush at three telespizas, driving them from a *Sterna* egg on which they were feeding. The rail then set to and finished the repast, dragging the embryo about in a vain attempt to swallow it."

The rail largely depended on the finch to open the eggs, but Munro and Palmer once saw a rail break a tern's egg. In Munro's words (1930:687), "It leaned well back, brought the end of its bill down on top of an egg with all the force it could muster and, flapping its wings and jumping off the ground, eventually broke through. Then it cleared a channel across the top of the egg and was about to enjoy its hard-earned meal when the tern came back and drove it off." In Palmer's account the rail is said to have eaten the contents before being driven off. Petrel eggs, of course, were normally laid underground by species that burrowed, but on Midway in 1940, the several hundred human inhabitants trampling on the breeding grounds caused the collapse of large numbers of burrows. This may have accounted for Bonin Island Petrel eggs found on the surface in fairly large numbers by Blackman. Many of these were seen broken and partly eaten, and rails were actually observed eating them. Blackman saw rails run down petrel burrows, often to dash out again immediately but frequently to stay three or four minutes or even longer. They may have eaten eggs or caught small insects while there.

The rail was fond of flesh and frequently it picked shreds of flesh and fat from carcasses of birds; in houses it sought tidbits scraped from skins of birds by collectors.

The presence of the afore-mentioned food resources had the following influences on the rail: (1) made possible the colonization of the island; (2) contributed indirectly to loss of flight; (3) encouraged retention of swiftness of foot and keenness of vision for capture of insects; (4) encouraged aggressiveness and pugnacity in obtaining egg contents from bird colonies and in driving competitors (finches) from the eggs, and (5) led to development of an omnivorous habit.

Blackman found that the rails would come readily and repeatedly to a small pan of fresh water to bathe and drink. Thus it is seen that they would use fresh water when available even though they doubtless got along without it much of the time. Since other rails inhabit dry areas remote from water on Pacific islands, it appears that the rails as a group are adaptable in their fresh-water requirements.

*Reproduction.*—On Laysan Island, nest building was under way in April, and nests were definitely present in June and July. The records of various observers indicate that the height of the nesting season came in these months. At Midway in 1940, Blackman found nests and young rails in late March, which appears to be earlier than usual.

A ring of juncus thicket growing around the lagoon on Laysan was the preferred nesting site, but bunch grass was also much used. On Midway, grass tufts were used for shelter, and one nest was reported under a trailing plant growing beneath ironwood trees. Most of the shelter available at Midway was *Scaevola*, and it is likely that nests were built under this shrub as well as in the grass.

Nests were made on the ground or on matted vegetation. Sometimes they were hollowed out of accumulations of dried juncus leaves which were more or less rearranged in place. In one such nest an opening between the stems close to the ground led into the nest through a runway about 6 inches long. The round cavity was within the clump of matted rushes, hence roofed, and was lined above and on all sides with soft, dried stems. The entrance way was not so lined. In grass tussocks the bulky nest was hollowed out of the mass of dried stems and leaves. In a nest in this situation the lining of the cavity was of finer shredded stems with some down from young albatrosses. Rothschild's (1900:9) description seems somewhat at variance with the foregoing, for it gives the impression that the nest was more or less wholly constructed, with a "cover placed over it"; however, his figure (*loc. cit.*, opp. p. 58) shows an open-cupped type of nest. Perhaps the amount of material hauled and built into the nest varied with the amount of matted grass already present in a suitable spot.

The first eggs were recorded at Laysan in May, the latest in June. All the eggs Fisher found in May were "fresh," and he thought they would have hatched about the middle of June. About a dozen clutches seem to have been recorded, and of them about two-thirds consisted of three eggs and the rest of two. This contrasts with 8-10 eggs per clutch for the Black Rail and 6-10 for the Yellow Rail of North America. The sizes of eggs are recorded as follows: average of 3 eggs, 29.2 mm.  $\times$  21.8 (Rothschild, 1900:10); typical of about 2 dozen eggs, 31.0  $\times$  21.1 (Fisher, 1906:801). Fisher says they do not vary more than a millimeter from 31  $\times$  21, but "occasionally one is slightly longer and wider." The eggs are not pointed but are subequal at the two ends, judging from Rothschild's figure. Fisher called them "bluntly ovate or elliptical ovate." The ground color was pale olive buff, while the maculations were predominantly pale raw sienna but also faint lilac gray, evenly distributed or sometimes more concentrated at the larger end.

Fisher thought the females stayed closer to the nests than the males, as more males were collected than females. The few nests he watched always contained old birds when visited.

Observations on Laysan showed that the chicks hatched out in numbers in June, but they appeared as early as March at Midway. The down of the newly hatched chicks was black, the bill was yellow, and the legs and feet were black. Immature birds with contour feathers were pale buffy tan underneath. Hadden says the downy young soon learned to feed themselves, and they developed an ability to run as fast as the older birds within the first five days. Very young chicks were able to give vent to much noise. He

believed the young were guarded for the first month, and Blackman saw an old rail accompanying a downy young on March 17.

The only estimate of the rail population available for Laysan is Dill's (1912:21), that "there are about 2,000 rails on the island." Impressions of abundance were received by himself and other authors, for he says "they were everywhere fairly abundant on all parts of the island excepting the beaches," while Fisher (1906:800) said they were "everywhere on Laysan in great numbers." Dill's estimate compares well with a computation based on a statement of Bryan's (1915:319) that "almost every square rod of the grassy portion of the island has its pair of rails." A rough calculation shows that a maximum of about 0.9 square miles, or 922 square rods, of grass land and vegetated land existed. This would account for 922 pairs of rails, or 1,844 breeding adults. Perhaps unpaired adults would have raised the number to more than 2,000.

Bryan remarked that rails in 1902 were almost as abundant at Midway as they were at Laysan. Caum thought there were 600 to 750 rails at Midway in 1923, which would give the figure of about 0.25 pairs per square rod of vegetated area, a density in keeping with Caum's opinion that these pugnacious birds "need plenty of room." In captivity Caum found that two pairs existed amicably in an enclosure of 6 x 12 feet, but that when more were present they fought. In 1939-1940, Blackman found them very numerous over almost the entire area of both the islands at Midway (1945:298).

#### SUMMARY

1. The Laysan Rail was discovered in 1828 and persisted for the following 116 years. No colonies were known to survive the year 1944.
2. The Laysan Rail lost the ability to fly. It used its wings in running, jumping and the intimidation of other small birds.
3. The rail was generally alert, comparatively fearless and highly inquisitive.
4. The food of the rail consisted of insects, birds' eggs, scraps of meat and vegetable matter.
5. Two or three eggs were laid per clutch: Downy young appeared from March through June, but May and June were the height of the nesting season.
6. In 1911, the population of rails on Laysan Island was about 2,000 individuals, or one pair per square rod of vegetated area.

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*Bernice P. Bishop Museum, Honolulu, Hawaii, August 26, 1946.*

## A NEW GENUS OF ICTERID FROM RANCHO LA BREA

By ALDEN H. MILLER

In the past the microfauna of the Rancho La Brea Pleistocene has been collected and prepared much less assiduously than have the large birds and mammals of this richly fossiliferous asphalt deposit. In the last year, however, Dr. W. Dwight Pierce and George Kanakoff of the Los Angeles Museum have developed a sifting technique for recovery of small fossils from the matrix and have obtained from Pit "A," excavated in 1929, a wealth of small bird and mammal bones. Dr. Hildegard Howard in sorting the bird bones discovered some bill parts of icterids which she kindly invited me to study and describe. These consist of an upper mandible, complete except for the extreme tip and the lateral border of the nasal fossa on one side, and two right lower mandibles, one nearly complete to the symphysis, the other lacking the posterior half. The more complete lower mandible has a tomial curvature and size that seem to fit properly with the upper mandible, and the two may be assigned to the same species until such time as actual association otherwise may be demonstrated. The second lower mandible probably is not of the same species, but it cannot be definitely allocated. The upper mandible, although distinctly icterine, has a number of structural features which set it apart from any living or known fossil genus of the family Icteridae. It may be known as *Pandanaris convexa*.

*Pandanaris*, new genus

*Generic characters.*—Upper mandible similar to that of *Tangavius* and *Molothrus* in shortness and great basal depth, and in shape and depth of central groove of palatal surface, but narial opening much larger (about 30 per cent, relatively) and anterobasal angle of opening more acute; culmen uniformly curved from base; without basal hummock present to varying degree in most icterids; internarial bridge broad, hence wholly different from that of cowbirds and blackbirds (including *Pyelorchampus*), the breadth equivalent to that in some caciques (*Amblycercus* and *Cacicus*), but without any of the associated restriction of narial opening found in that group of icterids.

*Type.*—*Pandanaris convexa*.

*Pandanaris convexa*, new species

*Type.*—Upper mandible (figs. 4a, 4b, 4c), including all of premaxillary, except extreme tip, the maxilla, except delicate maxillopalatine process, and lateral ramus of nasal on left side, no. K7278 Los Angeles Museum, from Pleistocene of Rancho La Brea, Los Angeles, California; excavated from Pit "A" in 1929.

*Description.*—See features given in generic characterization; in addition, tomium curved in lateral view, especially basally beneath anterior end of nasal fossa, as in *Molothrus*; basal half of culmen flat, not ridged, and posterior end of internarial bridge but slightly narrower than anterior end; posteroventral margin of nostril distinctly angled, not rounded.

*Referred lower mandible.*—The lower mandible (figs. 4b, 4d), no. K7279, seems somewhat long to correspond with the type until one fits it in place and notes in cowbirds a similar alignment of the posterior edge of the scar for the horn sheath with the posterior margin of the nasal fossa. Tomium viewed dorsally essentially straight and in line with ramus, not concave as in *Pyelorchampus*, the extinct Quaternary icterid from New Mexico (Miller, Auk, 49, 1942:39); tomium in lateral profile convex throughout; ramus posterior to termination of horn sheath strongly deflected downward; depth of mandible at posterior part of tomium much greater (60-70 per cent) than in *Euphagus*; articular area similar to that of *Molothrus* and *Euphagus* and unlike many genera of icterids in which the external postarticular process is distinctly elongated, associated with forceful opening of the mandibles for purposes of prying.

*Measurements.*—Upper mandible: anteroposterior length of nasal fossa, 7.0 mm.; greatest dorsoventral depth of fossa, 3.1; width across maxillaries at junction with jugal bar, 7.7; width of nasal bridge anteriorly, 4.5, posteriorly, 4.0.

Lower mandible: greatest depth of ramus near base of horn sheath, 4.0; length from posterior margin of horn sheath to end of postarticular process, 18.2.



*Pandanaris* has been compared with skeletons of all modern genera of icterids (see Hellmayr, Cat. Birds Amer., pt. 10, 1937) with the exception of *Ocyalus*, *Clypicterus*, *Macroagelaius*, *Ptiloxena*, *Xanthospar*, *Neospar*, and *Amblyramphus*. I am indebted to

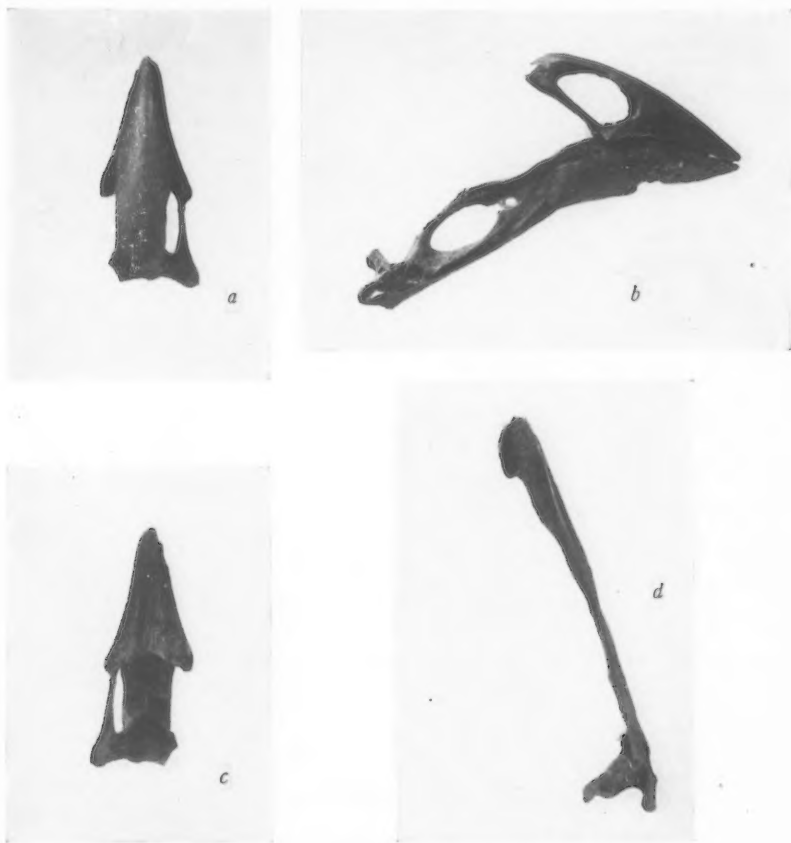


Fig. 4. *Pandanaris convexa*, new genus and species of icterid from the Pleistocene of Rancho La Brea. *a*, *c*. Dorsal and palatal views of upper mandible, type; *b*, lateral view of upper and lower mandibles; *d*, dorsal view of lower mandible, no. K7279; all  $\times 2$ .

Dr. Alexander Wetmore for opportunity to compare the fossils directly with all icterid material in the collection of the United States National Museum. A few genera not otherwise available were similarly compared at the American Museum of Natural History. Skins of the seven genera named above have all been checked and the information thus derived coupled with knowledge of the osteology of their close relatives leaves no doubt that *Pandanaris* is a unique type in the family.

In undertaking to find the natural affinities of *Pandanaris* within the family, we may rule out as near relatives the genera comprising the oropendolas with their highly developed frontal shields and constricted nostrils. Similarly the cacique group (*Cacicus*, *Archiplanus*, *Amblycercus*, *Cassiculus*, *Psomocolax*), with much reduced narial openings and expanded lateral processes of the nasal may be set aside. The large nasal fossa and its sharp ventral and posterior angles in *Pandanaris* further contrast, though less sharply so, with conditions in another series of genera: *Dolichonyx*, *Sturnella*, *Pezites*, *Leistes*, *Notiospar*, *Agelaius*, *Gymnomystax*, *Pseudoleistes*, *Xanthocephalus*, *Gnorimospar*, *Dives*, *Euphagus* and the grackle genera show a nasal fossa almost as large relatively as in *Pandanaris* but the fossa is more rounded and tends, as in the group containing *Sturnella*, to open dorsally rather than laterally. *Icterus* and *Lamprospar* possess fragile nostril structure; the fossae are large but the borders are thin. The cowbirds, like the group typified by *Xanthocephalus* and *Euphagus*, make a close approach to the fossil in nostril configuration and size and show a further, perhaps insignificant, resemblance in shortness of bill.

We may, then, regard *Pandanaris* as basically related by reason of features of the narial area to the more generalized icterids, the blackbirds and cowbirds; such a view is supported by similarities in configuration of articular area of the lower jaw, if one accepts the probable correctness of the reference of the lower mandible to *Pandanaris*. At the same time *Pandanaris*, probably as a parallelism, shows a distinctly broadened internarial bridge suggestive of the caciques. The peculiarly even curvature of the culmen of the fossil does not occur in any other icterid, but this is a feature that might have arisen in almost any of the known groups within the family. *Pandanaris* shows no evidence of being ancestral to any living genus; it is rather a representative of a line within the family that has died out.

Three other icterids have been described as new from the Quaternary of North America. These are: (1) *Euphagus affinis* Shufeldt, from Fossil Lake, Oregon, which we now regard as synonymous with the modern *Euphagus cyanocephalus* (see Howard, Carnegie Inst. Wash. Publ. 551, 1946:189); (2) *Euphagus magnirostris* Miller (Univ. Calif. Publ. Bull. Dept. Geol. Sci., 19, 1929:14) from Rancho La Brea which is closely related to modern species of that genus, although it is more robust; it in no way approaches the massive structure of *Pandanaris*; (3) *Pyelorchamphus molothroides* Miller (*loc. cit.*) of Shelter Cave, New Mexico, which, though falling in the same general section of the family, differs from *Pandanaris* in several particulars as noted previously. *Pyelorchamphus* was somewhat heavier and shorter billed than *Pandanaris* with more abrupt constriction of the bill tip. It had a completely different, narrow and elevated internarial bridge to judge from the upper mandible which has been referred to it.

Museum of Vertebrate Zoology, Berkeley, California, November 27, 1946.



## A NESTING OF THE PLUMBEOUS KITE IN ECUADOR

By ALEXANDER F. SKUTCH

I passed most of the months of August and September, 1939, in the vicinity of Puyo, a military post situated on the small river of the same name—a tributary of the Pastaza—in the Province of Napo-Pastaza, Ecuador. Here, at an altitude of about 3000 feet, the eastern foothills of the Andes, so high and rugged just a little nearer the backbone of the range, had dwindled away to a succession of low, rounded, forest-clad hills that continued as far as the eye could reach toward the vast Amazonian plain in the east. The excessive wetness of the climate was attested by the exuberance of the epiphytic growths that burdened the trees in the surrounding forest and by the swampy character of pastures even on steep hillsides. The forest, pressing close about the narrow clearings, stretched on and on for long distances. The fauna and flora were composed predominantly of lowland species; yet among both birds and plants I encountered highland forms whose presence at so low an elevation was a surprise and was apparently to be accounted for by the excessive humidity.

To my great disappointment, the breeding season of the great majority of species seemed to have ended before my arrival on August 9. I had hoped to study the nesting habits of some of the typically Amazonian species; but since so few of these were to be found breeding at the time of my visit, the discovery, on August 25, of a nest of the far-ranging Plumbeous Kite (*Ictinia plumbea*) assumed an importance it might not otherwise have had; and for nearly a month the kite family claimed a fair share of my attention.

The kites' nest was situated about ninety feet above the ground, far out on a horizontal branch at the top of a tall, slender, leafless tree growing beside a brooklet at the edge of a small clearing that bordered the Río Puyo. This elevated position made the structure quite inaccessible to man; but fortunately the back of a high, sharp ridge, rising between the rivulet and the river into which it fell, afforded an excellent view not only of the nest but also of its occupant. The bulky, shallow saucer of coarse sticks, so conspicuous amid the naked boughs, held a single small nestling, covered with white down. I could see the nestling clearly as it tumbled around in its lofty eyrie.

By September 12, the nestling was well covered with feathers and seemed almost ready to fly. It now stood upright on the nest, often upon the rim, moved about a good deal, devoted much time to preening its plumage, and at intervals spread its wings and flapped them vigorously, but without rising into the air, evidently because it kept a firm hold on the nest with its toes.

In plumage it was somewhat different from the parents. Its forehead and brows were whitish; the top of its head and hind neck were finely and closely streaked with gray on a light gray ground. Its back, rump and wings were dark gray, with a dark rufous area on the primaries, corresponding to that of the parents. There were prominent white tips on the longer remiges and less conspicuous white tips on the greater coverts. The tail was black with white bars on the outer feathers. The orbital region was black, all the under plumage so light a gray as to be nearly white and the breast faintly tinged with buff. The feet, like those of the parents, were bright orange.

It was after the nestling reached this stage of development that I devoted most time to the kite family. Between September 12 and 17, I spent twenty-two hours watching the nest, in all sorts of weather. When it rained, I found shelter beneath a big hut of palm-thatch and split bamboo, which, perched high above the ground upon massive

palm trunks, stood on the back of the ridge between the rivulet and the Río Puyo and commanded an excellent view of the nest.

#### FOOD AND MANNER OF HUNTING

The kites' nest was attended by both parents, which were too much alike in appearance to be distinguished. While watching it I learned much about their way of obtaining food. Because some of the peculiarities in their mode of attending the nestling resulted from a manner of hunting unusual among hawks, let us consider this first.

These Plumbeous Kites subsisted largely if not exclusively upon insects. I never saw them eat anything else. During all the hours that I spent watching them, I found no evidence that they shared the Swallow-tailed Kite's (*Elanoides forficatus*) habit of pulling young birds from tree-top nests. This might have been merely because so few other birds were nesting at this season. Although nearly all insectivorous birds seize their prey with their bills, kites—both the Plumbeous and the Swallow-tailed—follow the hawks' usual method of grasping it in their feet. Even insects so small that a little flycatcher would snatch them up in the bill are captured by the kites with their feet. This gives the hunting kite a most peculiar appearance. One watches the big bird soaring about overhead, striking out with one foot and then the other; and since its prey is mostly invisible at so great a height, one is at first greatly puzzled to account for this apparently purposeless behavior. The bird appears to be boxing with phantoms!

The kites caught most of their insect food while soaring effortlessly on widely spread wings on ascending currents of air in sunny weather. After making a capture, the kite would bend its head beneath its body, stretch one foot forward, and transfer the prey to its bill. When the insect was of good size, the birds appeared to tear it between the feet and the bill and eat it piecemeal, all the while continuing to soar about on set wings. The Swallow-tailed Kite captures and devours a large share of its food in similar fashion.

When atmospheric conditions were not favorable for soaring, the Plumbeous Kites caught a certain number of insects which their keen eyes detected while they perched motionless on an exposed branch high in a tree. Suddenly a kite would break its long period of immobility, flap its wings vigorously if the insect happened to be flying above it or dart swiftly downward with pinions half-folded if it was below, and easily overtake its victim by seizing it with a deft movement of one foot. The prey was then carried to a convenient perch, where the kite dismembered it between feet and bill and ate it at its leisure, with little, dainty mouthfuls. Even when flycatching from a perch, the kites caught most of their insects in the air. More rarely, while perching, they espied insects crawling over the nearby foliage which were of sufficient size to tempt them and darted down to snatch them up, more in the manner of a cotinga than of a flycatcher. At times they missed their intended prey, flew back to the perch, and darted down upon it a second time. But so far as I saw in the vicinity of this nest, the kites caught far less food when they were obliged to dart upon their victims from a stationary lookout than while favorable atmospheric currents permitted them to soar. Doubtless, too, flying insects were more numerous during those hours when the air was warm and ascending currents encouraged soaring.

Atmospheric conditions also determined how food was brought to the nest for the young bird. Since the great bulk of the food was caught while the parents soared, it was transferred to the bill at a distance from the nest and carried to the nest-tree in the bill, one insect at a time. Once I saw a parent transfer the insect from foot to bill as it glided down toward the nest; but usually, unless caught from the nest-tree or some neighboring lookout, the prey was transferred to the bill while the kite was still out of sight. One

unusually large insect was, however, borne to the nest-tree in both feet. It seemed that the kites experienced difficulty in carrying heavy insects in their weak bills and preferred to employ their talons for this purpose.

Even when brought to the nest-tree in the feet, the insect was usually taken into the bill before it was actually carried to the nest. One exception to this rule was witnessed when the parent alighted on a branch near the nest with a particularly big insect grasped in a foot. It moved to transfer this to its mouth; but after merely touching it with its bill, the bird straightened up and hopped to the nest still holding it in a foot. Once I saw a parent pull the wings from an insect while resting on a neighboring bough, then take it to the nest. Sometimes, when the day was cloudy or rainy and the parents, unable to soar, appeared to be hungry, they might consume a portion of one of the few insects they caught, then take the remainder to the nestling. Usually, however, the insect was taken whole to the nest, unless, indeed, the wings had been pulled off while the parent soared out of sight. After reaching the nest, the parent would rest upon the rim, and holding the insect beneath a foot—or possibly both feet if it were very big—tear off small bits with its beak and place them one by one in the mouth of the nestling. The young kite was never clamorous at mealtime, but waited quietly until it was served. So far as could be determined, the nestling's food consisted wholly of insects; but I recognized definitely only a large dragonfly. A number of the larger insects appeared to be beetles.

On September 16, for the first time, I saw a parent deliver a whole insect to the nestling, who, holding it beneath a foot, tore off pieces for itself, just as the adults did when they ate on a perch. The following day the insects were sometimes fed to the nestling bit by bit, sometimes delivered entire. Once, while the young kite was busy with the insect it had received some minutes earlier, the parent merely laid the latest one beside it in the nest. If the youngster had wandered along the branch beyond the nest, it would return to receive its meal in the eyrie. Once it was given a whole insect while it perched outside the nest, but it carried this back to the eyrie to dismember and eat it. The young kite was now almost ready to fly away.

#### RATE OF FEEDING

There was an amazing variability in the parent kites' rate of bringing food to the nest from hour to hour and from day to day. Most birds which nourish their young with insects or fruits carried in the bill rather than regurgitated, bring food to the nest with fairly uniform frequency. But with the kites, long periods during which little or no food was brought alternated with intervals of—for a hawk—amazingly frequent feeding. The rate of bringing insects to the nest appeared to be determined largely by atmospheric conditions. It is well known that the state of the weather affects the success of all insectivorous birds in finding food, especially of those that forage in the air. But it was surprising to find that the success in hunting of these big kites was influenced to a marked degree by atmospheric variations so slight that they would have hardly changed the rate of gathering food of a small flycatcher or a warbler.

The dependence of the kites upon the weather can best be illustrated by the analysis of the records made at the nest from day to day. As an indication of whether or not atmospheric conditions were favorable for soaring flight, I had not only the testimony of the kites themselves, but also that of the locally abundant Yellow-headed Vultures (*Cathartes urubitinga*). The weather in the Ecuadorian Oriente, unlike that of many tropical regions where rain falls at definite seasons and often at more or less definite hours of the day, is wholly unpredictable. It is quite as likely to rain in the early morn-

ing as in the afternoon. Hence I was able to watch the kites in different kinds of weather and to record great variations in the amount of food brought during the same hours of different days.

On September 12, I began to watch the nest at 8:00 a.m. and continued until noon. The early morning was cloudy; but about the middle of the morning the sun appeared through the clouds, and air currents became favorable for soaring. Between 8 and 9 the nestling received no food; but between 9 and noon the parents brought it eleven insects, six of these between 10 and 11. That afternoon, while the sun shone, the nestling was fed five times between 3:10 and 6:20.

On September 13, when I watched from 6:10 a.m. to 12:00 noon, the weather differed. The first half of the morning was darkly overcast, while during the second half rain fell almost continuously, at times quite heavily. All morning there was no sunshine; and no bird of any kind was seen soaring. During six hours, the nestling received only four insects; and before being taken to the nest, two of these were eaten in part by the parent, who must have been hungry. This parent, which I believe was the female, herself had no more than portions of these two insects between 6:39 a.m., when she began to guard the nest, and noon, when I departed in the rain; and it is not likely that she found much to eat before 6:39. After this hour, the second parent did not appear, but the one thought to be the female remained continuously in sight, guarding the nest. Both of the insects which she caught after 6:39 were captured by darting down from the perch to the foliage below, and both were shared with the nestling. The second of these she ate in part as soon as it was caught, then held the remainder during twenty minutes of immobility before she took it to the nestling.

On September 16 I arrived in sight of the nest at 8:15 a.m. The sun was then breaking through the clouds after a rainy night and darkly overcast early morning. The air was sultry, and there was a light breeze, which soon died away. During the remainder of the morning there were intervals favorable for soaring, alternating with brief showers during which the Yellow-headed Vultures and other soaring birds vanished from the air. During the four hours from 8:15 to 12:15, the nestling received eight insects, brought during the periods of more favorable atmospheric conditions.

On the following day, September 17, I watched the nest from dawn, at 5:45 a.m., until 11:00 a.m. For about an hour after the rising sun had dissipated the early morning ground mist, the sky was clear with bright sunshine. But by eight o'clock the gathering clouds obscured the sun, and the sky was soon completely overcast. By eleven o'clock, however, the gradually thinning ceiling of clouds permitted the passage of enough direct sunlight to cast a faint shadow, and soaring birds appeared overhead. During the bright hour following 6:25, when the nestling received its first morsel of breakfast, one of the parents brought it twelve insects, on as many visits to the nest. Seven of these insects were brought during the eleven minutes from 6:51 to 7:02. During most of the next two hours (7:02 to 9:25) the sky was overcast, and the same parent brought food only once more. Meanwhile the other parent, probably the female, rested continuously in the top of the nest-tree and brought the nestling only a single insect, which she darted down to catch as it flew beneath her high perch. From 9:25 to 11:00, the young kite received eleven additional insects, making a total of twenty-five during the first five hours of the morning. With the single exception already mentioned, all of these were caught out of my sight.

During 22 hours of watching, the hourly rate of feeding, for single hours, varied from 0 to 12. For three-hour periods, the rate of feeding varied from 0 to 14. The average rate on different days, as determined during watches of from 4 to 7 hours' duration,

ranged from 0.7 to 5.0 feedings per hour. During the whole 22 hours of watching, the nestling was fed 53 times, or an average of 2.4 times per hour. For a hawk, this seems to be unusually rapid food-bringing. I once watched the nest of a Laughing Hawk (*Herpetotheres cachinnans*) containing a single downy nestling. One parent kept almost constant guard, while the other brought a snake every morning and evening, just two a day, which formed the food not only of the nestling but also of the guardian parent. For insectivorous birds these kites showed an unexpectedly great hour-to-hour variation in the rate of feeding the nestling.

It is instructive to compare them with a pair of Northern Yellow-bellied Elaenias (*Elaenia flavogaster subpagana*) which I watched not long ago. These little flycatchers feed largely upon insects which, like the kites, they catch in the air. Also like the kites, both parents attend the nestling, and at this particular nest they hatched only a single one. From the morning the nestling hatched until the afternoon when it left the nest under a drenching rain, I devoted 22 hours to watching it, at all times of the day, and in all kinds of weather. The rate of feeding this Elaenia nestling, for single hours, ranged from 4 to 20 times per hour. The average hourly rate, computed for periods of from 4 to 8 hours, ranged from 6.0 to 14.8, increasing with the age of the nestling. Extremes of weather made less difference in the success in hunting of these small flycatchers than of the great soaring kites.

#### GUARDING THE NESTLING

When I began to make long-continued watches at the kite's nest, the young bird was already well feathered and no longer required brooding by day. Yet much of the time it was guarded by one of the parents, who rested in the top of the nest-tree, usually on the topmost bough. Whether the guardian was always the same, I could not tell with certainty, for I could not distinguish the parents by their appearance; but I suspect that it was always the same individual who guarded. On the evening of September 12, the parent who had been guarding the nest for nearly three hours went to brood the nestling for the night; this makes it probable that the guardian was the female. Her ability to rest motionless in the tree-top was remarkable. On a dark and rainy morning, September 13, she was present continuously from 6:39 until noon, nearly 5½ hours. During this period she varied her monotonous watching only by making a few brief sallies to capture passing insects, and by sitting in the nest for about forty minutes, during which the rain fell hard; but the nestling, instead of sheltering itself, stood beside her in the downpour.

The nestling was guarded chiefly in the early morning, the late afternoon, and during bad weather. In the late morning, when conditions were favorable for insect-catching, the nestling was seldom watched over, at least after it was older. But then the parents were coming frequently with food or else were soaring about in sight of the nest. While one parent guarded, the other, if it was not bringing food, remained continuously out of sight. On the bad morning of September 13, the second parent (the male?) did not appear at all during almost six hours.

One afternoon the guardian of the nest drove away a big, white-breasted toucan which flew past the nest-tree. On another occasion, while the supposed female guarded, the male, coming with food, found a Yellow-headed Vulture soaring about near the nest and drove it out of sight, then returned to give the nestling the insect that he bore in his bill. It was interesting to observe that the vulture, soaring with set wings, easily kept ahead of the kite, who was flapping hard.

All through the day, the feathered nestling kite stood up in the nest. But after sunset it settled down, and I could no longer see it from the ground. On the evening of Sep-



tember 12, it went to rest at 6:05, although the female did not come to brood it until fifteen minutes later. On the morning of September 17, the brooding parent flew from the nest in the gray half-light at 5:53, but the nestling did not stand up and become visible until 6:10. But during the day, the nestling, after it had grown older, would not submit to brooding even in the rain.

#### THE NESTLING'S DEPARTURE

By September 17, the young kite, who could already hold its food beneath a foot and tear it apart, began to make brief sallies from the nest, walking out along the supporting branch, then hopping back. The first excursion that I witnessed took it only about a foot beyond the rim, but this was soon followed by a longer journey. Often it flapped its wings vigorously, but always kept hold of the nest or the supporting branch. By September 20, however, the young kite was making short flights between the boughs of the nest-tree. Sometimes it directed its course outward from the tree as though to fly away, but after taking one or two flaps it circled around and returned to the sheltering boughs. While the young bird engaged in these exercises, a parent stood guard on the topmost branch, remaining there for nearly an hour. When the adults brought food, sometimes they fed the nestling piecemeal, as when it was younger, sometimes they delivered the insect whole for the youngster to break up for itself. Once, while the young kite, standing on a branch, was engaged in feeding itself with an insect that it had received entire from one of the parents, and doing very well, the other parent arrived with a big, lacy-winged insect. It first took the food to the empty nest, then flew across and alighted beside the fledgling, who alternately plucked bits from the insect beneath its own foot and received those placed in its mouth by the parent.

The next morning, September 21, the young kite continued to move about among the branches of the nest-tree and to be fed there by the parents. I last saw it there at noon, when a parent was feeding it an insect, piecemeal. When I returned at 5:20 p.m., the fledgling had left; but a parent was resting on the topmost branch of the tree. It lingered in the same spot, resting and preening; for the next hour, and flew away just at sundown. The nest-tree remained deserted for the night.

Since I did not know the age of the nestling kite when it was first found as a downy chick on August 25, I cannot tell how old it was when it left the nest. But it could hardly have been less than four days old when first seen, which would make its period in the nest at least one month.

#### INCIDENTAL OBSERVATIONS

While I watched these kites, the only notes I ever heard from them were thin, high-pitched, weak monosyllables, sometimes repeated twice or thrice and uttered usually when they came together at the nest-tree after a period of separation. The eyes of both adults were bright yellow, not red, as in Sutton's (1944) painting of a more northern race of this species. Otherwise these Plumbeous Kites in the Ecuadorian Oriente rather closely resembled the Mexican bird portrayed by Sutton.

Nearly three years after I watched these Ecuadorian Plumbeous Kites, I met the first and only member of the species that I have seen during thirteen years in Central America. On February 15, 1942, while riding along a grassy road in the basin of El General in southern Costa Rica, I saw a kite resting in a small roadside tree. I dismounted from my horse and moved about below the bird, while it perched motionless, looking down at me and giving no evidence of fear. Finally, by dint of considerable waving of arms and clapping of hands, I caused it to take wing, for I wished to see it in flight as well as at rest. Carriker (1910:444) includes this kite in his key to the Costa Rican hawks,

but fails to give it a place in his numbered list of the birds of the country. Griscom (1932:163) states: "This pretty little kite is chiefly migratory in Central America, although a few individuals winter in the Caribbean lowlands; from late March to the middle of May flocks containing as many as fifty birds have been noted occasionally drifting northward, and I have frequently seen such myself in Nicaragua and Panamá."

#### SUMMARY

A nest of the Plumbeous Kite containing a single downy nestling was found near Puyo in the Oriente of Ecuador on August 25, 1939. The young bird was fed by both parents, largely if not exclusively upon insects. The adult kites caught most of these insects while soaring. At times an adult left its perch to overtake an insect that flew by; more rarely it snatched some small creature from the foliage, darting past without alighting. The kites invariably seized their prey in their feet, but transferred it to the bill before reaching the nest. At first the parent tore the insect between its feet and bill and passed small pieces to the nestling; but after the young kite was feathered, it received whole insects and broke them up itself. The rate of feeding the nestling was amazingly variable and was determined largely by atmospheric conditions. Food was brought most frequently while the sun shone, under conditions of ascending currents that favored effortless soaring; in cloudy or rainy weather, when soaring birds were "grounded," the nestling received scarcely any food. During 22 hours of watching, the rate of feeding, for single hours, varied from 0 to 12 times. For three-hour periods, the rate varied from 0 to 14. The average rate on different days, as determined by watches of from 4 to 7 hours' duration, ranged from 0.7 to 5 feedings per hour. Even after it was feathered and no longer brooded by day, the nestling was guarded much of the time by one of the parents.

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## NOTES ON SOME BIRDS OF SONORA, MEXICO

By JOHNSON A. NEFF

The writer, accompanied by George W. Peterson of Nogales, Arizona, spent the period from May 25 through July 18, 1942, in a study of the abundance and distribution of the White-winged Dove, *Zenaida asiatica mearnsi*, in Sonora, covering some 4,500 miles of roads and desert trails. No collecting was possible, and accordingly only sight records were made.

Our field notes have been reviewed since the recent issuance of A. J. van Rossem's distributional list of birds of Sonora (Occas. Papers Mus. Zool., Louisiana State Univ. No. 21, 1945:1-379). A short list of selected observations was sent to him and at his suggestion has now been revised and prepared for publication. Effort has been made to select observations which will extend known ranges, or those which have some other bearing on natural history.

Field work in Sonora rapidly brings the student to an appreciation of van Rossem's statement that "there is no existing map of Sonora which can be considered accurate in all of its features." The place names used in these notes are those which appear on an official map of Sonora distributed by the Secretaria de Agricultura y Fomento, D. F., Mexico, a map drawn on a scale approximating 10 kilometers to  $\frac{3}{4}$  inch and printed in four sections. Localities described in the following list are those which are not found in any standard atlas. They are tabulated with approximate latitude and longitude or other description.

Agua Caliente and Valle de Agua Caliente: east of Guaymas, Yaqui River drainage, 28° 0'-28° 30' N, 110° 0'-110° 30' W.

Cocospera: about 110° 40', 30° 50', on Rio Babasac northeast of Imuris.

Cornelio: on Hermosillo-Nogales highway about 130-135 miles south of Nogales.

El Tecolote Rancho: about 15 km. east of La Colorada.

Imuris: on the railroad about 40 km. north of Magdalena.

La Colorada: on Mazatan highway east of Hermosillo; not on my maps.

Misa: about 110° 35', 28° 20'.

Moreno: on the railroad, at intersection with 28° 30', south of Hermosillo.

Ocuca: on Altar-Santa Ana road, near intersection 110° 30' and 30° 30'.

Pozo Crisanto: 111° 15' and 29° 45'; 12 miles west of Carbo.

San Jose: village on Mazatan highway east of La Colorada; not on my map.

San Manuel: 10 km. northeast of Ocuca.

Santa Ana: on highway and railroad, 40 km. southwest of Magdalena.

*Ardea herodias*. Great Blue Heron. A single bird was seen at a reservoir at Cornelio, on June 6. This seems to be somewhat south of van Rossem's listed locations.

*Mycteria americana*. Wood Ibis. A flock of about 250 birds was seen soaring high in the air over Pozo Crisanto on June 23; this location is far inland and the flock was apparently headed north toward Arizona.

*Ajaia ajaja*. Roseate Spoonbill. One bird was watched with binoculars for fully two hours at ranges as low as 50 yards on June 1 on a reservoir some six miles west of the village of Moreno, well inland from any location listed by van Rossem.

*Anas acuta*. Pintail. Two birds were seen on June 13 on a large lake several miles northeast of the town of Cananea; at this date these birds should have been nesting.

*Buteo albicaudatus hyospodius*. White-tailed Hawk. We camped for the week beginning May 25 near the village of Agua Caliente close to a spring and small reservoir, and each day as many as four of these hawks could be seen soaring overhead at the same time. This location is considerably east and north of the locations listed by van Rossem.

*Buteo albonotatus*. Zone-tailed Hawk. Three nests were found, the first on June 14 on the Rio Babasac southwest of Cocospera in an inaccessible location. The second was on June 22 at Pozo Crisanto; it contained one downy young. The third was near El Plomo on July 15, where a juvenile able to fly short distances was banded. The latter record is farther west than van Rossem's stations.



*Buteo nitidus maximus*. Gray Hawk. Two pairs were present on El Tecolote Rancho east of La Colorada in early June; one of each pair had been killed by the rancher. One was still fresh enough to examine on June 3, and in its gullet was found the remains of a small heron or bittern including one foot which bore the comb on the toe. It was said that no free water outside wooden or concrete tanks was to be found within ten miles. I photographed the nest and two eggs of one of these pairs (fig. 5).

*Buteo swainsoni*. Swainson Hawk. Common everywhere. This species is included because of a pair found nesting along a road several miles west of Pozo Noriega on June 20; one of the pair was ex-



Fig. 5. Nest and eggs of Gray Hawk, *Buteo nitidus maximus*, at Rancho El Tecolote, near La Colorada, Sonora; June 3, 1942.

tremely light in plumage, the other as melanistic as the species ever becomes. Together they made a strange contrast.

*Parabuteo unicinctus*. Harris Hawk. A family, two adults and four young, frequented one large tree near the reservoir at Cornelio, and on June 23 remains of seven White-winged Doves were found close to the tree. Seen also at many other points.

*Lophortyx douglasii*. Douglas Quail. Two birds were seen for a brief period some eight miles west of Moreno on June 1.

*Colinus virginianus ridgwayi*. Masked Bob-white. A covey of some thirty-odd birds was watched for some time as it fed along the road near us on June 1, a few miles south of Punta Agua, in the north end of the Valle de Agua Caliente.

*Zenaida asiatica mearnsi*. White-winged Dove. The largest nesting colony of this species that the writer has ever been privileged to observe was found on July 11 in the dense jungle-like thickets between Pitiquito and Caborca, largely on the property of Señor M. D. Varela; this colony numbered several thousand pairs.

*Scardafella inca*. Inca Dove. We were greatly surprised when we failed to find this dove in Sonora as commonly as in Arizona. The only ones seen were in Altar village on June 15 and 16, and on July 8, 9, and 10.

*Coccyzus americanus*. Yellow-billed Cuckoo. One bird was seen on June 14 along the Rio Babasac south of Cocospera. Another was seen and a nest located in the wilderness forest of giant mesquite north of Ocuca, close to San Manuel, on June 18.

*Bubo virginianus*. Horned Owl. A pair of adults and two flying young were found in a mesquite thicket across the Altar River from the village of Altar; they were seen on June 15, 16, and on July 8, 9, and 10.

*Chloroceryle americana*. Green Kingfisher. A single bird was seen often, on June 13 and 14, feeding alongside our camp on the bank of the Rio Babasac several miles southwest of Cocospera.

*Progne subis*. Purple Martin. Easternmost point of observation was in the lower Río Babasac canyon about ten miles northeast of Imuris, somewhat east of giant cactus range, on June 13 and 14.

*Parus sclateri*. Mexican Chickadee. Several seen along the Río Babasac northeast of Imuris on June 13 and 14, apparently well south of the range given by van Rossem.

*Parus wollweberi*. Bridled Titmouse. Several were seen working about the river bottom brush along the Río Babasac between Cocospera and Imuris on June 14 and 15.

*Icteria virens*. Chat. Heard singing along the Río Babasac, June 13-15, between Cocospera and Imuris; this point is well south of most of van Rossem's records.

*Cassidix mexicanus*. Boat-tailed Grackle. A few to several birds were seen at a number of points, almost all villages or towns, and all activity seemed to center around groups of palm trees from which young birds could be heard calling. In such habitats they were seen in Hermosillo, La Colorado, San Jose, Magdalena, Santa Ana, Imuris, Altar, Pitiquito, and Caborca. The only rural location where they were found was about a ranch in the north end of the Valle de Agua Caliente on May 27.

*Passerina versicolor*. Varied Bunting. This bunting was found commonly about a water trough on a ranch near the north end of Valle de Agua Caliente on May 26 and 27, and one was later seen at Pozo Crisanto.

*United States Fish and Wildlife Service, Denver, Colorado, March 20, 1946.*

## FROM FIELD AND STUDY

**Notes on the Philippine Brown Hornbill.**—During a three-month military assignment (August, September, October, 1945) near the city of Zamboanga, Mindanao, I regularly observed wild flocks of Brown Hornbills (*Buceros hydrocorax*) which inhabited the tree-top level of the dense mountain forests lying a few miles inland from the city. Being large, strikingly colored and noisy, they would have been indeed difficult to overlook during their early morning and late afternoon foraging expeditions when they flew from tree to tree or from hillside to hillside, calling as they went and alternately soaring and beating their heavy wings. The regularity of these excursions is such that their sonorous calls serve to waken the natives in the morning and summon them home from the hillside fields at the end of the day. During the warmer part of the day the hornbills are silent and inactive and, unless unduly disturbed, remain hidden in the foliage of the highest jungle trees.

Throughout the period in which I was able to observe them they flew in small groups which averaged from three to seven in number. Although they were sometimes observed only in the company of others of their species, they were more commonly to be seen amid the much larger flocks of another tree-top species, the White-headed Hornbill (*Aceros leucocephalus*), which seldom flew in groups of less than twenty individuals and were by far the most common hornbills of that region. The White-headed Hornbill was differently colored and marked and considerably smaller than the Brown Hornbill so that the two species were easily distinguishable when they flew in mixed flocks. They associated not only in feeding, but also in their foraging flights over the jungle and in roosting. Despite the well known irritability of hornbills, the relationship seemed to be a peaceable one and on no occasion did I observe any signs of incompatibility. A third species of hornbill, the Tarictic Hornbill (*Penelopides panini*) was never seen to mix with flocks of either of the other two but remained in the central and lower levels of the forest and at that season apparently lived a solitary existence.

During the three-month period the wild birds seemed to feed mainly on insects, wild figs, and feral guavas, which comprised the chief components of stomach contents of several specimens collected. However, feeding preferences expressed by a captive bird then in my possession would indicate that during seasons when more succulent fruits are available to wild birds such may be preferred as a food source. Of the fruits offered, the captive hornbill, an adult male, invariably chose those which were high in both water and sugar content, preferring such types as mango, papaya, sweet sop, tangerine, orange, and mangosteen to drier fruits such as wild figs, guava, marang, and banana or relatively tart ones like pomelo, lime, and tomato. In his choice of fruits, color seemed to play an important part. A variety of papaya with red flesh was always preferable to one of an orange hue, just as any orange colored fruit was always eaten before any interest was evinced in one of a yellow or cream color. Canned fruit salad mix, in which the fruits were diced to a more or less uniform size, seemed to confirm the theory the foregoing observations suggested. Upon being introduced to this artificial mixture of fruits unknown to him, the hornbill immediately selected first the sections of cherry, then those of peach, and last those of colorless pineapple and pear sections and grapes, and when offered the mix on subsequent occasions he never failed to eat its ingredients in exactly the same order. His greatest enthusiasm was expressed for any food of animal origin such as bird eggs, locusts, grasshoppers, frogs, lizards and snails. As he accepted such fare, his head would wobble with excitement much in the manner of a young bird when fed by its parents. The food was taken in the tip of the bill, tossed up and then swallowed, a process accompanied by a convulsive gulp and an erection of the bird's crest. Upon accepting any large insect such as a four- or five-inch grasshopper or a walking stick of similar dimensions, he would run it back and forth through the tip of his beak, crushing the heavy exoskeleton with a series of rapid snappings of his powerful bill. Only when he had rendered it a soggy, shapeless mass, would he attempt to swallow it. In addition to the insects which we caught and carried to him, he was quick to seize any which flew into his cage and he caught them in midair with a speed amazing for so large a bird.

The call of a wild bird in flight was a repeated, clear and resonant honk which in character and timber resembled somewhat that of a large goose. The sound of a flock of calling hornbills carried for miles through the still air of the jungle. When confronted with food, my captive bird usually emitted a single harsh squawk and he gave a short coarse bark whenever he was angry or frightened. This last note he reserved mainly for stray dogs which wandered into our yard and to which he held unmistakable aversion.—KEN STOTT, JR., *San Diego Zoo, San Diego, California, July 17, 1946.*

**The Great-tailed Grackle in the Upper Rio Grande Valley.**—The Great-tailed Grackle (*Cassidix mexicanus*) has been reported as nesting in New Mexico in the vicinity of Las Cruces, Dona Ana County, and Carlsbad, Eddy County (Bailey, *Birds of New Mexico*, 1928:658). Peterson (Condor,

41, 1939:217) saw grackles south of Isleta, Bernalillo County, on May 5, 1939, and surmised that they might be nesting. I had the colony that Peterson reported under observation from April, 1938, to September, 1942, and he was correct in his guess that the birds were nesting. The presence of this species along the Rio Grande north of Las Cruces is a considerable extension of its previously reported range and the details of its occurrence are worth recording.

On April 12, 1938, a male Great-tailed Grackle was seen at Elmendorf, 18 miles south of Socorro, Socorro County, and five males were seen at a pond one mile south of Isleta. On May 8, 1938, one male was seen one mile north of Isleta and 12 males and 5 females were found at the pond south of Isleta. A female collected at the pond on this date had enlarged ovaries, the largest measuring 10 mm. in diameter. This specimen is no. 86711 in the Museum of Vertebrate Zoology and has been identified by Dr. Alden H. Miller as *Cassidix mexicanus prosopidicola* (see A.O.U. Check-list Supplement, Auk, 61, 1944:460).

During the period of these observations, the pond at Isleta was shallow and weedy with a rank growth of cattails (*Typha*). It was frequented by many species of aquatic birds. The pond was visited again on June 12, 1938, and the grackles were found nesting in a dense patch of cattails at its west side. There were five grackle nests in these cattails: one with 2 eggs; one with 3 eggs; one with 2 newly hatched young; and two that were empty, but excrement about their margins indicated that they had contained young birds. Four young grackles, able to fly awkwardly, were perched in the cattails near the empty nests.

Great-tailed Grackles were seen at the Isleta pond each summer from 1938 to 1942, but I did not again search for their nests. The pond was not visited at regular intervals, and dates of seasonal arrival and departure of the birds are only approximate. In 1939, there were no grackles at the pond on March 22, but on April 2, two males were seen. In 1940, Mr. Barney Hodgkin of the Soil Conservation Service saw about twelve grackles at the pond on March 13, and on March 16 I saw one male. A flock of about 25 was seen at the pond on November 10 and again on November 16, 1940. One male was seen November 30, 1940. On November 16, 1940, ten grackles were seen in trees alongside the highway 3 miles south of Los Lunas, Valencia County.

This species nests and also winters at Las Cruces, New Mexico. A flock of 20 was seen in trees near the Loretta Academy in Las Cruces on January 16, 1940. On January 18, 1940, a flock of approximately 200 was found at the south edge of the town, and on January 21 flocks of 10 to 30 birds were seen within the town. This grackle also winters and nests in Juarez, Chihuahua, Mexico. I saw adults and young in the trees of the plaza at Juarez on May 31, 1940, and found adults there in January, 1931.

Mr. Adrey E. Borell of Albuquerque, New Mexico, reports to me that on May 15, 1943, he observed a male Great-tailed Grackle at a pond on the Ojo del Espirita Santa Grant, 18 miles northwest of San Ysidro, Sandoval County.

In summary, the Great-tailed Grackle nests one mile south of Isleta, which is about 170 miles north of Las Cruces and Carlsbad, where previously it was known to nest. The farthest north that it has been seen in New Mexico is 18 miles northwest of San Ysidro.

I am indebted to Dr. Alden H. Miller for identification of the grackle specimen and to Mr. Adrey E. Borell for allowing me to use his observations.—LAWRENCE V. COMPTON, *Soil Conservation Service, Washington, D.C., November 1, 1946.*

**Anna Hummingbird at Play.**—I had an interesting experience with a hummingbird while watering my garden in Benicia, California, on June 13, 1946. Frequently I have enjoyed watching a hummer flit through the spray while watering in my yard with the garden hose. On this occasion the water was flowing from the hose in a solid stream about three-quarters of an inch in diameter. A hummingbird, an adult female Anna (*Calypte anna*), flitted alongside the flowing stream and eyed it, then dipped her bill into the stream of water, not apparently drinking as she did not open her mandibles. Then she took a position facing the stream, brought both feet forward and dipped them into the water. Finally she came at right angles to the flow and attempted to light on it as though it were a twig or limb and rode down the stream a way, repeating this stunt over and over again.

When she flew away, I remained motionless holding the hose, suspecting that she might return. This she did after a brief interval and went through almost the same maneuvers, apparently enjoying her fun as much as I enjoyed watching her.—EMERSON A. STONER, *Benicia, California, June 13, 1946.*

**The Blue Goose in Yolo County, California.**—C. G. Fairchild, United States Game Management Agent, of Sacramento, California, has just brought my attention to the following significant record. On the afternoon of January 8, 1946, Joe Patterson of Elk Grove, Sacramento County, California, killed a Blue Goose (*Chen caerulescens*) in a rice field near Sycamore Slough, Yolo County. This bird had been feeding with a mixed flock of Snow and White-fronted geese in a field between

Knights Landing and Dunnigan just before it was shot by Mr. Patterson. The specimen was mounted and is now in the possession of Mr. Patterson at his home in Broderick, Yolo County.—STANLEY G. JEWETT, Portland, Oregon, June 10, 1946.

**The White-winged Dove in San Diego County, California.**—The range of the White-winged Dove (*Zenaida asiatica*) in California is defined by Grinnell and Miller (Pac. Coast Avif. No. 27, 1944:185) as, "extreme southeastern corner of state: valley of Colorado River north from the Mexican line to vicinity of Needles, San Bernardino County; northwest from Imperial Valley to Coachella Valley, Riverside County and Twentynine Palms, San Bernardino County." Several "vagrant occurrences" have been recorded to the north and west of this range, the earliest for July 18, the latest January 17. All are for solitary birds except for a group of 6 which apparently wintered in the vicinity of Redlands, San Bernardino County (McAllister, Gull, 22, 1940:25). These records seem to indicate post-breeding wandering, a supposition which is further substantiated by our observations.

We saw two of these doves at noon on July 25, 1946, at Yaqui Well, a permanent desert water-hole in San Diego County, 13 airline miles east of Julian. At sunset of the same day, 8 White-winged Doves were seen on the bare ground adjacent to the spring. Two were seen in the mesquite trees in this vicinity the following morning and again on August 1. One White-winged Dove was seen an hour before sunset on August 31, 1946. Further search was prevented by lack of time.

The presence of these birds on several occasions points to more than an accidental occurrence, and the records of subsequent seasons will be watched with interest to see if the White-winged Dove will establish itself as a regular post-breeding visitant to favorable localities along the western edge of the Colorado Desert.—PHILIP H. KRUTZSCH and KEITH L. DIXON, Museum of Vertebrate Zoology, Berkeley, California, September 23, 1946.

**Bitter Cherry and Serviceberry as Food for Birds.**—Within a couple of yards of my house in Portland are two kinds of wild fruit trees. These are *Amelanchier florida*, the western serviceberry, and *Prunus emarginata*, the bitter cherry. The first bears several-seeded, blue berries with a rather insipid, sweetish flavor. The second bears very small red cherries that are as sour as pie cherries and intensely bitter as well. In 1946 the serviceberry fruit was ripe by mid-July, and most of the crop had dried on the twigs five weeks later. The cherries were ripe by mid-August, and ripe ones were available until about October 10.

To the human palate the serviceberries were vastly superior to the cherries, but not, apparently, to the birds. The only species regularly utilizing the serviceberries was the Purple Finch (*Carpodacus purpureus*). Half a dozen finches could be seen working on them at any time of day for about a month. They ate only the seeds and entirely discarded the pulp. This was observed many times at a distance of but a few feet. Other species eating the whole berries were Robin (*Turdus migratorius*), and Cedar Waxwing (*Bombycilla cedrorum*), each observed on two or three occasions, and Steller Jay (*Cyanocitta stelleri*), once. Purple Finches and Waxwings continued to use the berries after they were dried.

The bitter cherries, however, were quite another matter. The first bird seen to eat the cherries was an *Empidonax* which I believe was the Traill Flycatcher (*E. traillii*); one or both of a resident pair ate several on two or three occasions early in the season when the cherries were scarcely ripe. Later they were not observed to take any, although they used the trees for perches until they left about September 1. Probably two-thirds of all the cherries were eaten by Robins. Toward the end of the season they had much difficulty because the only fruit left was at the extreme ends of slender twigs where the Robins could not easily reach it. The next most avid cherry eaters were a dozen or so Chestnut-backed Chickadees (*Parus rufescens*). They arrived *en masse* several times a day during all the time the cherries were fully ripe. A chickadee would flutter in the air, seize a cherry in its beak, fly to a twig, hold the fruit with one or both feet, and eat the pulp. The seed was allowed to fall. After each bird had eaten five or six cherries, the flock would depart only to return in a couple of hours. Russet-backed Thrushes (*Hylocichla ustulata*) were seen nearly every day, but usually singly until the crop was almost gone; then eight or ten thrushes completely cleaned the trees in a period of three or four days. Cedar Waxwings fed in the cherry trees at some distance, but seldom paused to feed in those close to the house when they saw us only a few feet away.

Birds commonly seen perching or foraging in both the trees, but never observed to take either fruit, were Western Wood Pewee (*Myiochanes richardsonii*), Black-capped Chickadee (*Parus atricapillus*), Bush-tit (*Psaltiriparus minimus*), Solitary Vireo (*Vireo solitarius*), Orange-crowned Warbler (*Vermivora celata*), Long-tailed Chat (*Icteria virens*), Spotted Towhee (*Pipilo maculatus*), Oregon Junco (*Junco oreganus*), and Song Sparrow (*Melospiza melodia*).—R. M. BOND, Soil Conservation Service, Portland, Oregon, November 11, 1946.

**The Bank Swallow Breeding in Humboldt County, California.**—Past reports of the Bank Swallow (*Riparia riparia*) nesting in Humboldt County have proved often to refer to the Rough-winged Swallow (*Stelgidopteryx ruficollis*). Bank Swallows, however, were recently observed during the breeding season, and a search for evidence of nesting was made. In the summer of 1946, five nesting pairs were located. Each bred successfully. In Humboldt County at least, the Bank Swallow nests solitarily. Instead of colonies, individual pairs occur at isolated sandy bluffs. One often finds the nesting burrows of both Kingfishers and Rough-winged Swallows in the same type of bank, but in this area the Bank Swallow does not associate with them.

The first nest discovered was in a vertical highway cut at the Orick Look-out, just south of Orick, Humboldt County, California. The nest was about twenty feet above the paved surface of the highway. Their favorite perch was a high power line opposite the nest opening. Five juveniles were noted with the parent birds on June 20, 1946.

A second nesting site was located on June 14, 1946, at Luffenholtz Creek, near Trinidad, Humboldt County. The nest was located about midway up a sandy cliff, between rocky headlands. The cliff was estimated to be about eighty feet high and overlooked both the ocean and the mouth of the creek. Four young were noted here on July 1, 1946.

Another pair was located nesting at Essex Rock, on the Mad River. Young were noted on June 20, 1946; at this time the young were flying about and there were at least three. Here the nest was located in a clay and sand bluff overlooking the water.

At Table Bluff, four young were observed on June 20, 1946, but no nesting burrow could be located. At this site there are extensive sandy bluffs at least one hundred feet high. The swallows perched on power lines above the bluffs.

The fifth site was found on the Van Duzen River. The nest was about thirty feet above the river in a sandy face. Young and adults were observed on June 21, 1946, but no accurate count could be made because of the activity of the birds.

Although many suitable bluffs are located in this area, no other nests of this species were found. In the Rough-winged Swallows, two pairs often nest in one bank; but in the Bank Swallow but one pair was found at each occupied nesting site. In each instance the nesting site or exposed bluff face overlooked water.—ROBERT R. TALMADGE, *Eureka, California, November 26, 1946.*

**The Distribution of the Yuma Horned Lark in Arizona.**—The range of the Yuma Horned Lark (*Otocoris alpestris leucansiptila*) has been assumed not to extend eastward into Arizona beyond the lower Colorado River valley. Monson and Phillips (Condor, 43, 1941:109) recently have detected a probable breeding locality near Gila Bend and another "22 miles east of Quartzite." The latter is definitely a breeding station, but the determination of race was based on a single juvenile and admittedly tentative. The place cited, which may be designated either as 22 miles east of Quartzite or 7 miles west of Hope, Yuma County, is a dry lake bed or "playa" of considerable extent and crossed by U. S. Highway 60. It is the only locality along this highway between the Colorado River valley and the higher plains country eastward which is suitable for a breeding colony of Horned Larks. The colony there is fairly populous and probably exceeds a hundred pairs. Two males, three females, and two juveniles not yet fully grown were collected there by Dr. Loye Miller and myself on May 10, 1945, and these are typical of *Otocoris alpestris leucansiptila*. The provisional identification by Monson and Phillips is thereby confirmed. Although we have traversed a good deal of territory seemingly suitable for Horned Larks south and southeast of this colony, we have not detected any Horned Larks during the breeding season other than a female and three juveniles which were collected on May 8, 1945, about three miles west of Hassayampa. These, like the Hope specimens, appear to be typical of *leucansiptila*, with no discernible tendency toward *adusta* of southeastern Arizona.

In extreme eastern Yuma County there occurs a rather abrupt change from the prevailing "rock and cactus" desert to higher, mesquite-grass plains and intermountain valleys of an average altitude of 2000 feet, a terrain apparently ideal for Horned Larks which extends into northwestern Maricopa County and southwestern Yavapai County. Yet along the fifty miles of Highway 60 between Salome and Wickenburg there is apparently but one area in which Horned Larks are to be found. This extends from Aguila eastward about twelve miles and centers about the Forepaugh cattle ranch. On June 17 and July 24, 1939, Phillips (*loc. cit.*) collected from "flocks" in this area several adults and one young of the Montezuma Horned Lark. Under the circumstances he was quite justified in recording the locality as within the breeding range of *Otocoris alpestris occidentalis*. On July 5, 1945, Dr. Miller and I collected from small flocks in the same locality two males, two females, and two juveniles in molt, all of which, with one exception, were *occidentalis*. The exception was a female with the characters of *leucansiptila*. On April 18, 1946, we again visited the locality and collected a series of six males and four females. At this date the birds were present in pairs or singly. The males were singing



and the females had either just laid or were about to do so; in fact, one female contained an egg which would have been deposited the following day. This series is not *occidentalis*, which we had every reason to expect, but *leucansiptila*. The males are indistinguishable from comparable examples from the Colorado and Imperial valleys; the females average slightly darker than is typical for the race but may be duplicated by selection.

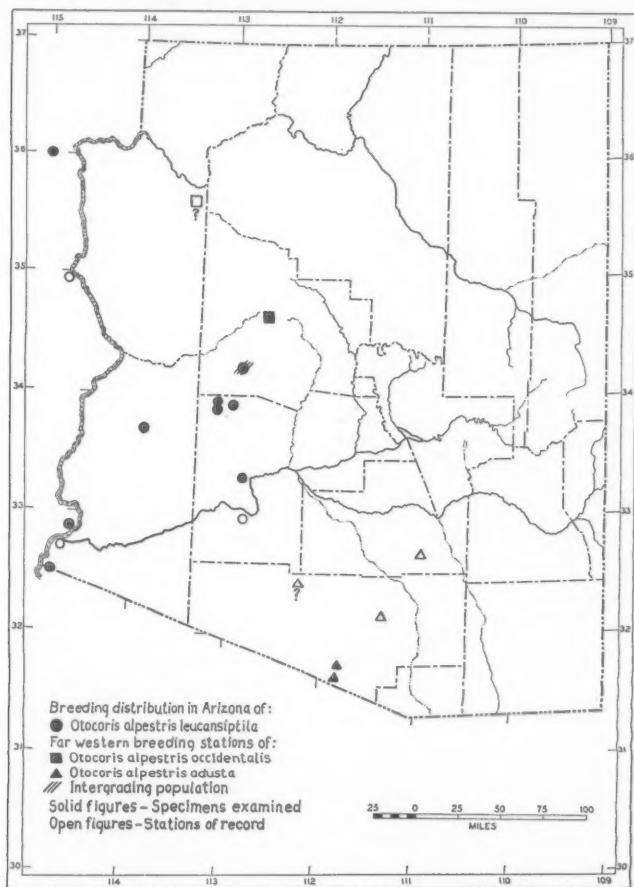


Fig. 6. Distribution of Horned Larks in western Arizona.

At Congress Junction in Yavapai County, a locality about twenty-five miles northeast of Aguila and at a considerably higher elevation (3060 feet), we located another breeding colony concentrated on and about an abandoned landing field. Four males and two females collected on April 18, 1946, show a definite departure from typical *leucansiptila* in darker, although not browner, coloration. The measurements are slightly greater than is typical of *leucansiptila* and are as follows: Males: wing, 101.5, 102.0, 102.5, 103.0 mm.; tail, 67.0, 69.5, 69.5, 70.0. Females: wing, 92.0, 95.0; tail, 59.0, 63.0. The differences may be interpreted as tendencies toward *occidentalis* at still higher altitudes a short distance northeastward; however, these birds are so distinctly closer to *leucansiptila* that if an arbitrary name is required, it must be the latter.



Facts of more than passing interest in the distribution of the Yuma Horned Lark are that it ranges eastward far beyond the confines of the Colorado River valley, to occupy areas of considerable diversity in topography, coloration and character of soil, vegetation, altitude, and climate. Such tolerance to a variety of environments makes all the more perplexing the "spotty" nature of its distribution, with corresponding absence over large areas of suitable territory. Also, the mountain race *occidentalis* occurs as early as the latter part of June in certain parts of the range of *leucansiptila*. Therefore, "breeding" records outside of the demonstrated breeding range, even when supported by the presence of fully grown juveniles must be viewed with suspicion until further proof is forthcoming. It is not impossible that this early dispersal is common to other races of Horned Larks in southern Arizona. With this suspicion in mind I have suggested, by use of a question mark on the map (fig. 6), the desirability of confirmation for "breeding" records of *occidentalis* in the Kingman region and of *adusta* at Ventana Ranch in Pima County. This suggestion carries no criticism of the publishers of these records; in fact, Sutton and Phillips (Condor, 44, 1942:61) were careful to mention that the specimens taken at Ventana were not definitely breeding.—A. J. VAN ROSSEM, *Dickey Collections, University of California, Los Angeles, July 16, 1946.*

**Notes on the Birds of Utah.**—While in army service, the writer lived in Utah for two years, chiefly at Ogden. Behle's recent "Check-list of the Birds of Utah" (Condor, 46, 1944:67-87) served as an invaluable guide; the following notes made during my residence there constitute a few minor additions to that work. Dr. Behle himself kindly identified most of my specimens, but the Fox Sparrows were determined by Dr. George M. Sutton. All specimens taken are now in the Cornell University Collection at Ithaca, New York. All places referred to are in Weber County unless otherwise stated.

*Colymbus auritus*. Horned Grebe. Not reported from Utah since Henshaw (Rept. Geog. and Geol. Expl. and Surv. West 100th Mer. by George M. Wheeler, vol. 5, 1875:489) reported it from Rush Lake. One was seen on Pine View Reservoir on April 19, 1945.

*Aix sponsa*. Wood Duck. A lone female was seen beside the reservoir in Blacksmith Fork, Cache County, July 2, 1944.

*Melanitta fusca*. White-winged Scoter. On Pine View Reservoir, in 1945, two were seen on March 29, eight on April 5, and two on April 19.

*Mergus merganser americanus*. Common Merganser. Not given a winter status by Behle (*op. cit.*: 70). A male was collected on December 15, 1945, 6 miles west of Logan, Cache County. On the Weber River, 2 to 6 miles west of Ogden, one was seen on December 8, 1945, two on December 31, 1945, one on January 19, 1946, and one on February 2, 1946.

*Charadrius semipalmatus*. Semipalmated Plover. Listed from Utah only on the basis of sight records in the Uinta Basin by Twomey (Ann. Carnegie Mus., 28, 1942:390). One was seen May 6, 1945, at Harrisville.

*Charadrius vociferus*. Killdeer. Not a winter resident in northern Utah according to Behle (*op. cit.*: 73). One was seen on February 6, 1944, 2 miles west of Plain City and another on December 25, 1944, 2 miles south of North Ogden.

*Bartramia longicauda*. Upland Plover. One was seen on May 6, 1945, at Perry, Box Elder County.

*Tyrannus verticalis*. Western Kingbird. One was seen 3 miles north of Levan, Juab County, on December 13, 1945. This seems to be the first winter report from the state.

*Nucifraga columbiana*. Clark Nutcracker. Some interesting observations on migration were made in 1945. At elevations between 6800 and 8000 feet on Mount Eyrie, just east of Ogden, on September 3, over 350 were counted in 3 hours. All were flying rapidly southward along the crest of the ridge; ten flocks of 25 or more birds and many pairs and single individuals passed over; an adult male and an immature male was taken. The next time Mount Eyrie was ascended, on September 22, three nutcrackers flew overhead, all in a southerly direction. A week later, September 29, a single nutcracker was seen, again streaking southward along the crest of the ridge.

*Sturnus vulgaris*. Starling. Two were seen 4 miles northwest of Ogden on March 13, 1945. There have been two previous reports from Utah (Lockerbie, Condor, 41, 1939:170; and Grater, Condor, 44, 1942:41).

*Vireo vicinior*. Gray Vireo. Two were seen in the juniper-piñon forest on August 22, 1945, 6 miles southeast of Salina, Sevier County. This record seems to be the northernmost for Utah.

*Acanthis linaria*. Common Redpoll. A flock of six was seen on February 20, 1944, a mile north-west of Perry, Box Elder County, and a flock of twenty was seen on March 11, 1945, at 6500 feet on Mount Eyrie.

*Spinus psaltria*. Green-backed Goldfinch. About 100 were seen on February 6, 1944, near Plain City, and a flock of eight on February 20, 1944, at Perry, Box Elder County. Flocks of two to forty were seen on the following dates in the lowlands within 6 miles of Ogden: March 19, 1944; Decem-

ber 25, 1944; December 8, 1945; December 15, 1945; December 22, 1945; January 19, 1946; February 2, 1946. On December 22, 1945, a female was shot near Slaterville, but was not preserved. Behle (*op. cit.*:84) listed this species only as a summer resident.

*Passerella iliaca*. Fox Sparrow. One was seen on February 6, 1944, near Plain City; four on February 20, 1944, at Perry, Box Elder County; one on May 10, 1944, and one on December 25, 1944, near Bonneville Park; one on April 6, 1945, near Harrisville; four on September 22, 1945, on Mount Eyrie (one taken); five on September 29, 1945, on Mount Eyrie (one taken); one near Marriotte on February 2, 1946. These transient and winter records, mostly from lowland thickets, presumably represent more than one race, but the two September specimens, from 7100 and 8000 feet, are *P. i. schistacea*.—J. DAN WEBSTER, *The Rice Institute, Houston, Texas, October 15, 1946.*

**Occurrence of Black Rail in San Francisco.**—So little is known regarding the status of the Black Rail (*Laterallus jamaicensis*) in the San Francisco Bay region, outside of the fall and mid-winter months, that the following incidents seem worth recording. On April 2, 1945, Mr. Raymond Smith of the California Academy of Sciences discovered the crushed remains of a Black Rail on the drive next to the Shakespeare Garden in Golden Gate Park, San Francisco. It was found about noon and apparently had been run over by an automobile the previous night. Although readily recognizable for purposes of identification, it was not in suitable condition for preservation. In view of the time of year and unusual locality of occurrence, this individual was thought perhaps to have been a migrant en route south.

Another Black Rail was brought to the California Academy of Sciences on August 9, 1945, by William Miller. This rail was alive at the time, having been captured by a cat at about 10:30 p.m. the previous night at Roosevelt Way and Castro Street in San Francisco. Efforts to induce the bird to eat were unsuccessful. Later dissection showed it to have been suffering from internal injuries, probably received from the cat. It was preserved, however, as a study skin (C.A.S. no. 58550) and proved to be an immature female. The bill is not fully grown, measuring only 12 mm. along the culmen. In plumage it conforms to the description of the juvenal of the species given by Bent (U. S. Nat. Mus. Bull. no. 135, 1926:329). Furthermore, it is the only specimen, out of a total of 63 skins of the Black Rail from California in the Academy collection, that is not in seemingly adult plumage.

There are a few summer records for this species in central California (see Bent, *op. cit.*; Grinnell and Miller, *Pac. Coast Avif.* no. 27, 1944:130ff.; Stoner, *Condor*, 47, 1945:81). These indicate that Black Rails sometimes remain in this region during the reproductive period, although they may not be breeding individuals. The presence of a juvenile, however, such as was found in San Francisco on August 9, 1945, is significant. It is unlikely that such an immature bird would have wandered far from the locality in which it was hatched. While members of this species have not been discovered nesting outside of San Diego and San Bernardino counties, the possibility exists that small numbers may breed in the San Francisco Bay region. Black Rails are notably elusive and extremely difficult to see except in winter when high tides flood the salt marshes, thus submerging the dense growths of pickle-weed (*Salicornia*) which they inhabit, and force the birds into less secluded situations. A small summering population, therefore, might easily escape detection.—ROBERT T. ORR, *California Academy of Sciences, San Francisco, California, August 22, 1946.*

**Chestnut-sided Warbler in Marin County, California.**—On September 24, 1946, we captured in one of our water traps at Manor, Marin County, California, an immature Chestnut-sided Warbler (*Dendroica pensylvanica*). This bird was not taken in the trap next to the aviary of American warblers as were the Tennessee Warblers (*Vermivora peregrina*) and the American Redstart (*Setophaga ruticilla*) of previous record, but entered a trap located nearest to shrubbery bordering a creek which bisects our grounds.

Neither Mrs. Kinsey nor the writer was familiar with this eastern species, and considerable difficulty was experienced in our first efforts properly to identify it. Since this individual was in immature plumage and lacking the chestnut side patches of the adult, we found it no easy task to run down the secondary characteristics of general coloration, eye ring, and wing bars, all or part of which are applicable to so many other warblers. Moreover, *pensylvanica* has a "big-eyed" appearance, not unlike that of vireos, a feature we have never noted before in any of the warblers with which we have worked. Identification was subsequently confirmed by comparison with skins in the California Academy of Sciences.

The captive Chestnut-sided Warbler has been banded and introduced to artificial food. It will be held over winter in our large, heated shelter until spring, when it will be released in the main warbler aviary. Color characteristics should, by that time, be sufficiently developed so as to enable us to determine sex. The only previous Californian record of this species, apparently, is that from Sherwood,

Mendocino County, for September 21, 1908 (Marsden, Condor, 11, 1909:64).—ERIC CAMPBELL KINSEY, *Manor, Marin County, California, October 2, 1946.*

**Cuculus canorus on the North American Continent.**—Under date of July 25, 1946, an Eskimo on the Seward Peninsula, in Alaska, wrote to me saying, "I myself got only one bird which I don't know as it's the first kind I have seen. It may be Common bird to you but it's a rare bird up here I wish I had it with eggs I got this bird up at tundra." Other notes in the letter showed that it was collected near Cape Prince of Wales, Alaska, on the mainland of North America. I hardly knew what to expect as he also stated that it was a "Siberian bird (or Flicker)."

On August 21, 1946, I received the specimen in good condition and was agreeably surprised to find that it was a cuckoo that is new to the North American mainland. The label attached to the specimen read "Siberian (Flicker) June 28, 1946. FEMALE." I gave it my number 8295 and sent it to Dr. Herbert Friedmann for proper identification, as a paper by Friedmann and Riley (Auk, 48, 1931:269) seemed to be the latest information concerning the Asiatic cuckoos on the islands between Alaska and Siberia.

Under date of September 5, 1946, Dr. Friedmann wrote as follows: "The bird is a Siberian Cuckoo, *Cuculus canorus*. It is a young bird and is not completely identifiable to subspecies but is probably of the race *telephonus*." This is the first time that *Cuculus canorus* has been collected on the North American continent.—WILSON C. HANNA, *Colton, California, September 19, 1946.*

**Cranes and Egrets in Douglas County, Oregon.**—During the summer seasons of 1945 and 1946, I have had the opportunity of observing and photographing in Douglas County, Oregon, two species which, to my knowledge, have not previously been recorded from there. They were the Sandhill Crane (*Grus canadensis*) and the Common Egret (*Casmerodius albus*). Both were seen in a swampy meadow near the south shore of Diamond Lake, at an elevation of 5,162 feet.

A pair of adult cranes was seen in the months of June and July, 1945. The birds were quite tame, usually allowing the observer to approach to about thirty yards before taking flight. I believed them to be nesting because of their apparent reluctance to leave the west end of the meadow and because of the prolonged disappearance of one of the birds on some occasions. The nest was not found, nor were cranes seen there in 1946.

On August 18, 1946, I returned to the same meadow and saw a flock of eleven Common Egrets and one Great Blue Heron (*Ardea herodias*). I took several still photographs of the egrets at that time. The egrets apparently were merely passing through, for on August 25, 1946, I searched all of the suitable meadows at the south end of the lake without seeing them again.

Gabrielson and Jewett (Birds of Oregon, 1940:229) state the breeding range of the Sandhill Crane in Oregon to be Klamath, Lake, and Harney counties. They further state that there are records from outside of the breeding range only for April, September, and October. The same authors (*op. cit.*:107) state that the Common Egret is a summer resident of Klamath and Harney counties. The only other records reported by them are those of vagrants from Multnomah and Lake counties.—VERNON E. THATCHER, *Medford, Oregon, October 11, 1946.*

**Cactus Wrens Use "Extra" Nest.**—Various suggestions have been made regarding the purpose, if any, of the "extra" nests built by wrens. These include presumptions that the several nests are built to serve as a ruse to trick enemies, as a lure for a mate, as markers for territorial claims, or as ready shelters if the nest in use is destroyed.

Early one June evening I observed three young of the Cactus Wren (*Heleodytes brunneicapillus*) that had left their nest during the day teetering about in a mesquite which spread its branches over a flat roof. Four feet from the other side of the building an Arizona cypress held a new, unused Cactus Wren nest. Both parents noisily fussed about their young and soon got them down onto the roof. Then one parent coaxed from the cypress while the other tried to steer all three fledglings in that direction. A fledgling would not sooner reach the cypress than he would flit back to the roof or even up into the mesquite. The performance was lengthy, repetitious and exciting, but the parents accomplished their aim and the three young wrens were finally snuggled together for the night in that "extra" nest. I watched their return to the same nest for several evenings. The parent wrens occupied nearby roosting nests. In another year at a nearby locality, I saw a pair of Cactus Wrens giving their young similar care.

Several "extra" nests appear in the vicinity of a brood nest during the incubation period. It may be suggested that some or all of these are built for the fledglings to occupy when they become old enough to roost by themselves.—ADA ANTEVS, *The Corral, Globe, Arizona, October 8, 1946.*

## NOTES AND NEWS

The new cover drawing which appears on this issue of *The Condor* is the outgrowth of a long period of study and consultation by Club members. J. Laurence Murray, the artist, we believe has done an excellent job and has performed a great service in providing this illustration for the Club, of which he is an active member. Further, he has been most patient and willing in adapting his skills to the wishes of the committee charged with developing a new design. The figure of the bird itself follows closely a photograph taken by Carl B. Koford and selected by him as a suitable pose for the drawing. Moreover, Koford's unparalleled acquaintance with the California Condor in life has been drawn upon repeatedly in verifying details of outline. The background designed by Murray represents typical condor country in the mountains of Ventura County, California.

At the meeting of the Board of Governors in May, 1946, the change of the subtitle of *The Condor* to "Journal of the Cooper Ornithological Club" was approved. At that time the Board of Governors voted that the editors form an advisory committee to take final responsibility in devising and adopting either a new or modified cover design. The design that had been in use with minor changes since 1902 was thought subject to correction in the light of greatly improved modern acquaintance with the bird and its habitat. This view was adopted after due consideration for the fact that the old design had become a traditional symbol of the Club and its publication. The group of advisors included Ed N. Harrison and Carl B. Koford in addition to the editors; J. R. Pemberton, Loye Miller, and W. Lee Chambers, also thoroughly familiar with the bird in life, contributed helpful counsel.

Kenneth Stager, Curator of Ornithology and Mammalogy at the Los Angeles Museum, left Los Angeles in the middle of December for a three months' collecting trip in Mexico. His headquarters are at a mining camp in Copala, Sinaloa, and from there he expects to make extensive collecting trips into the surrounding country. This is the first field expedition sponsored by the Museum's Division of Science since December, 1941.

Recently accessioned by the Salinas Junior College is the ornithological library of the late O. P. Silliman, of Salinas, California. Mr. Silliman spent many years studying the bird life of central California and amassing a significant library on the subjects of ornithology, general zoology, and

Pacific explorations. The collection will be maintained as a separate unit at the Junior College and will be made available to the interested public as well as to students.

## PUBLICATIONS REVIEWED

"The Birds of Chile," by J. D. Goodall, A. W. Johnson, and R. A. Philippi B. (Las Aves de Chile, su conocimiento y sus costumbres, Platt Establecimientos Graficos, S. A., Buenos Aires, volume 1, 1946, 358 pp., 50 colored pls., many ills., \$5.00 U.S.) is an excellent handbook in Spanish dealing with nomenclature, characters, measurements, geographic range, field marks, and habits. We agree enthusiastically with William Vogt who in the prologue states that the work is "the best book on birds yet to be published in the Spanish language." The presentation of measurements in standard statistical form rather than through the inadequate and misleading tabulation of mere averages and extremes is a distinct advance over the treatment in any handbook on North American birds. The samples used for measuring are often small, but this situation could not be remedied in an undertaking of this kind. Resident and visiting ornithologists in Chile and adjoining countries will find this work an invaluable guide and a source of interest. Volume 1 deals with the orders Passeriformes, Micropodiformes, Caprimulgiformes, Piciformes, Cuculiformes, Coraciiformes, Psittaciformes, and Columbiformes. A second volume will deal with the remaining orders.—A.H.M.

Arthur Cleveland Bent of Taunton, Massachusetts, former President of the A.O.U. and author of the "Life Histories of North American Birds," was the guest of honor at an eightieth birthday dinner given November 25, 1946, at the University Club, Boston, Massachusetts, under the auspices of the Nuttall Ornithological Club of Cambridge. Mr. Bent originally joined the Nuttall Ornithological Club in 1888 and is now an Honorary Member.

The dinner was presided over by President James L. Peters, who presented Mr. Bent with a scroll on which were the names of all those present. President Peters then turned the meeting over to Hoyes Lloyd of Ottawa, Canada, who was Toastmaster and who in turn presented Dr. Alexander Wetmore of the Smithsonian Institute, who made a short address, and then presented Professor W. Elmer Ekblaw of Clark University, Worcester, who also spoke.

## COOPER CLUB MEETINGS

## NORTHERN DIVISION

OCTOBER.—The monthly meeting of the Northern Division of the Cooper Ornithological Club was held on October 24, 1946, in Room 2503 Life Sciences Building, University of California, Berkeley, with 64 members and guests present. Proposals for membership were as follows: Frank H. Crymes, 5 Forest Lane, Berkeley, by Alden H. Miller; Joseph H. Connell, International House, Berkeley, by Keith L. Dixon; Mrs. Frances Hamerstrom, Pinckney, Michigan, by Robert W. Storer; and Mary Drake Cecil, 608-H San Gabriel Ave., Albany, Frank P. Filice, 1045 Judah St., San Francisco, Francis B. Mathews, 2730 Dwight Way, Berkeley, J. Basil Bowers, 381 51st St., Oakland, and Reverend Edward Martin, 1924 Cedar St., Berkeley, by Charles G. Sibley.

Dr. Miller read a letter from Mr. C. E. Persons, Acting Regional Director of the National Park Service, in regard to a move on foot to instigate control of wolves in Mt. McKinley National Park. A bill, H. R. 5401, has been introduced into Congress which will cause such measures to be taken if passed. Cooper Club members are urged to write to their congressmen expressing opposition to the measure.

Under "Review of Recent Literature" Dr. Miller apprised the Club of a newly received book, in English, on "The Breeding Birds of Denmark," by Jespersen. Mr. Cain called attention to the reprinting of Hoffmann's "Birds of the Pacific States."

The first speaker of the evening, Charles Sibley, discussed the Spotted Towhees of the Mexican Plateau. The second speaker, John Davis, reported on the Brown Towhees of the same region.—CHARLES G. SIBLEY, *Recording Secretary*.

NOVEMBER.—The monthly meeting of the Northern Division of the Cooper Ornithological Club was held on November 21, 1946, in Room 2503 Life Sciences Building, University of California, Berkeley, with 56 members and guests present. Aaron B. Ross, 3432 Washington Blvd., Ogden, Utah, was proposed for membership by W. H. Behle, and Ralph P. Frazier, 621 18th St., Oakland 12, Calif., was proposed by Charles G. Sibley. Mrs. Kelly reported Hooded Mergansers on Phoenix Lake in Marin County on November 3 and Phainopeplas at Arroyo Mocho near Livermore on November 20.

The speaker of the evening, Mr. Carl B. Koford, discussed "Observations at a Condor Nest." —CHARLES G. SIBLEY, *Recording Secretary*.

## SOUTHERN DIVISION

OCTOBER.—The monthly meeting of the Southern Division of the Cooper Ornithological Club

was held in Room 145, Allan Hancock Foundation, University of Southern California, Los Angeles, Tuesday, October 29, 1946, with about 85 members and guests present. The following were proposed for membership: Frank Cassell, Dept. of Zoology, Colorado State College, Fort Collins, Colo., and Miss Sheila Counce, 1134 Pleasant, Boulder, Colo., both by Gordon Alexander; Enos Oren Mellinger, North Lima, Ohio, by John McB. Robertson; Kenneth F. MacDonald, 2912 S.E. 75th Ave., Portland 6, Ore., and Grace Sharritt Nelson, National Elk Refuge, Jackson, Wyoming, both by Stanley G. Jewett; and John F. Mann, Jr., 1217 W. 22nd St., Los Angeles 7, Calif., by Dorothy E. Groner.

Attention of the Southern Division was called to a brochure received from the National Park Service on the question of eliminating wolves from our National Parks. With one vote dissenting, it was moved, seconded and carried that wolves in the National Parks be protected. Luther Little was instructed to so notify the Park authorities.

C. V. Duff announced an impending membership drive with particular emphasis on securing new members in the vicinity of Los Angeles who would be interested in attending Southern Division meetings and suggested that each member endeavor to secure at least one candidate.

Kenneth E. Stager, newly appointed Curator of Ornithology and Mammalogy at the Los Angeles Museum, spoke of ornithological experiences, "On the Road to Mandalay"; Kodachrome slides and specimens were shown.—DOROTHY E. GRONER, *Secretary*.

NOVEMBER.—The monthly meeting of the Southern Division of the Cooper Ornithological Club was held in Room 145, Allan Hancock Foundation, University of Southern California, Los Angeles, Tuesday, November 26, 1946, with 60 members and guests present. The following names were proposed for membership: R. M. Wright, Jr., Santa Susanna, Calif., by J. S. Appleton; Gordon W. Gullion, 1657 E. 13th St., Eugene, Ore., and Edwin D. Bloor, Jr., Lawrenceville, N. J., both by C. V. Duff; Mary E. Duker, 650 N. Los Robles Ave., Pasadena 4, Calif., M. W. de Laubenfels, 400 S. Bonnie Ave., Pasadena 4, Calif., Arvord W. Belden, 1109 Columbia St., So. Pasadena, Calif., John Tobin, 3750 Mohawk St., Pasadena 10, Calif., and Robert Bramman, 1456 N. Los Robles Ave., Pasadena, Calif., all by Dorothy E. Groner.

Mary V. Hood reported seeing a Black Oystercatcher at Playa del Rey in November.

J. R. Pemberton, the speaker, told of the "Birds of Patagonia."—DOROTHY E. GRONER, *Secretary*.



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*For Sale, Exchange and Want Column.*—Each Cooper Club member is entitled to one advertising notice in any issue of *The Condor* free. Notices of over ten lines will be charged for at the rate of 15 cents per line. For this department, address JOHN McB. ROBERTSON, Buena Park, California.

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WANTED—Life Histories of North American Marsh Birds, A. C. Bent, U. S. National Museum, Bulletin No. 135. Please quote price.—H. W. CARRIGER, 5185 Trask St., Oakland 1, Calif.

FOR SALE OR EXCHANGE—*Condor*, vols. II-XLI, except for vols. XXVI, XXXV, XXXIX and XL. Pacific Coast Avifauna, nos. 1-26. Bent's, nos. 113, 121, 142, 146, 176 and 179. Ridgway's Birds of North and Middle America, 1-9, 1-7 bound. Make reasonable offer, prefer exchange. Want: Bull. Amer. Mus., 1932 to date; Proc. Phila. Acad., 1925 to date; Proc. Zool. Soc. London, 1925 to date; Proc. Boston Soc. Nat. Hist., 1925 to date; all N. A. Fauna; Ibis, 1915 to date. What have you?—ROBERT L. RUDD, *Museum of Vertebrate Zoology, Berkeley 4, Calif.*

WANTED—A few nice Mountain, California, Gambel and Massena Quail skins in good condition to be mounted for museum exhibition; also Central American skins, small and medium sized species.—W. LA BRIE MUSEUM, Kamourska, Quebec, Canada.

FOR SALE—Snodgrass and Heller, Hopkins-Stanford Galapagos Expedition—1898-99. The Birds, \$1.00. The Birds of Clipperton and Cocos Islands, \$0.50. Bent's Life Histories North American Birds, complete to date, 14 volumes, \$150.00; odd numbers of most are on hand.—F. N. BASSETT, 722 North Orange Drive, Los Angeles 38, Calif.

FOR SALE—The Auk, vols. 59, 60, 61 and 62, \$3.00 per volume. Will exchange for herpetological publications.—BENJAMIN H. BANTA, P. O. Box 605, Reno, Nevada.

WANTED—Between Pacific Tides, by Edward F. Ricketts and Jack Calvin, Stanford University Press, 1939. Name your price.—JOHN DAVIS, *Museum of Vertebrate Zoology, Berkeley 4, Calif.*

FOR SALE—The Condor, 1915 and 1916, complete; 1917, all but Nov.-Dec. issue; 1918 and 1919, complete; 1920, Jan.-Feb. only; 1924, complete and five issues without covers; 1932 through 1938, complete, all in good condition.—GEORGE MIKSCH SUTTON, *Museum of Zoology, University of Michigan, Ann Arbor, Michigan.*

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